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THE UNIVERSITY OF ALBERTA

NON-INTELLECTUAL CORRELATES OF ACADEMIC PERFORMANCE

by

Paul Douglas King

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

SPRING 1986

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Date OCT. 31/85

ABSTRACT

This study was designed to investigate the relationships between selected non-intellectual factors and high-school academic achievement. Non-intellectual factors included study habits, study attitudes, personality, school attitudes, socioeconomic status and their sub-variables, resulting in twelve non-intellectual variables. Academic achievement was defined as grade-point average based on scores derived from final grade 11 English and Mathematics examinations.

Participants in the study included 373 students composed of 174 girls and 199 boys, drawn from 22 grade 12 classes, enrolled in 7 Edmonton Public high schools. Test instruments were administered during regular school hours and included the Survey of Study Habits and Attitudes (Form H) of Brown and Holtzman (1967), the Eysenck Personality Questionnaire, the School Attitude Measure, and the Blishen Socioeconomic Index, designed to evaluate social class.

It was hypothesized that extraversion, neuroticism, psychoticism, school attitudes, study habits, study attitudes and SES would be significantly related to academic achievement. Results were confirmed as hypothesized for psychoticism, study habits, study attitudes and the school attitude sub-variables. Contrary to expectations, results failed to support the hypothesized relationships between academic achievement and extraversion, neuroticism or socioeconomic status.

Data analyses involved three types: descriptive statistics, correlation analyses, and regression analyses. In each case, this analysis was first based on the total sample and for each of the male

and female sub-samples separately. Data descriptive of the total Edmonton sample are consistent with previous research and normative statistics for the 13 variables of interest. Results generally revealed the mean scores of females to be superior to those of males with reference to grade-point average and non-intellectual variables.

Correlation analyses revealed significant relationships between grade-point average and non-intellectual variables as hypothesized. Self-Concept-Reference Based, was found to have the highest relationship with academic achievement for this study. Similar patterns of correlation statistics were revealed for both the female and male sub-samples, although the magnitude of these relationships for girls was higher than that reported for boys.

Regression analyses determined that the combined power of the 12 non-intellectual variables accounted for significant portions of the variance in grade-point average. Self-Concept-Reference Based was consistently the single most powerful predictor of high school achievement for the total sample, and the female and male sub-samples as well.

In summary, the results of the study pointed to significant relationships between grade-point average and non-intellectual variables. Implications for practice are discussed and include the need for school personnel to be more cognizant of the impact of non-intellectual factors. The provision of more student supportive programs like effective consultative services, student support groups, peer tutoring, assertiveness training, and more diversified school activities is recommended.

Implications for research include the need to discover the effects of non-intellectual variables in other populations and age groups such as junior-high school, learning disabled, enriched, and underachievers. From this, new knowledge about the impact of such factors might be generated.

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1. INTRODUCTION

1.1 Cognitive and Non-Cognitive Variables--The Problem

A major goal of education and schooling is to bring about changes in students. These developments and consequences of schooling are often conceptually divided into two major fields of interest, the non-cognitive and the cognitive. Measures of cognitive characteristics are usually identified with intellective abilities, information-processing skills and subject-matter knowledge. The cognitive domain includes all forms of intellectual activity like attending, perceiving, remembering, associating and evaluating - all behaviours that can loosely be called "thinking". Activities such as learning to read, using correct grammar and solving mathematical problems are largely cognitive and deemed very important in the educational sphere. The aim is to produce "correct" behaviours.

These cognitive skills have had a long and honorable history of involvement in educational practice, and justifiably so. They have been predictive of both current and later school success and so provide realistic and useful foundations for diagnosing for learning strengths and weaknesses, and for instructional and remediation programming (Messick, 1979). English & English (1958) have suggested that cognitive attributes constitute aptitudes in the technical sense of present characteristics that are predictive of the capacity to learn.

The non-cognitive, or non-intellectual domain, however, has been seen to consist of such diverse phenomena as student's motives, values,

temperament, experiential background factors and affect including school attitudes and interests (Messick, 1979). A large class of these non-cognitive variables are described as "affective", and include feelings about school, about learning, about subject matter, and about the self as a learner (Bloom, 1976). Affects are then positive and negative feelings that may be either specific to particular conditions or states, or characteristic of particular individuals or traits.

Other non-cognitive variables, however, are demographic in nature, and include such factors as age, sex, social class, ethnic background, etc. Such elements although not psychological or developmental in their own right, are nonetheless widely employed throughout educational research and practice due to their marked covariation with such variables and their attendant predictiveness of educational outcomes (Walberg & Marjoribanks, 1976).

Comparisons between the cognitive and non-cognitive, however, are both difficult and awkward because the distinctions are artificial. Once the term cognitive is appropriated to refer to intellective abilities and subject-matter achievement in conventional school areas, a usage popularized by the Taxonomy of Educational Objectives (Bloom et al., 1956), non-cognitive factors then come to the fore by default to describe everything else. Analagously, the contrast between cognitive and affective offered by the Taxonomy is also confusing as the variety of phenomena referred to as "affective" are not all primarily traceable to feelings and emotions. Simply inflating the meaning of "affect" invites inaccuracy and misconception. The cognitive, non-cognitive,

affective and other subsystems of human characteristics have differentiable properties to be sure, but they are complexly and intricately linked and may be sorted into dichotomous classes only at the price of confusion. It is in this frame of reference that some features of cognitive and non-cognitive dimensions are discussed, with the assertion that cognitive does not imply only cognitive, and that non-cognitive does not imply the absence of cognition.

It is clear, however, that simple contrasts between cognitive versus non-cognitive are still popular and extensive in spite of the danger of stereotyping, as they do feature major distinctions worth noting for education (Krathwohl et al., 1964). The differences between these psychological constructs are not categorical, but only of degree in the relative balance between intellective and non-intellective determinants of individual variations (Tyler, 1983). Cognitive measurements, for example, usually contrive conditions to mobilize attention and optimize motivation to yield a maximal performance estimate of skill or achievement (Messick, 1979). In non-cognitive measures, however, performance levels are typically gauged under conditions controlling for extraneous information-processing demands, so that a self-concept scale would not be a reading comprehension test in disguise (Ringness, 1975). The absence of right-answer keys forces non-cognitive assessment to draw inferences from consistency in response rather than correctness of response as utilized in cognitive measures. Non-cognitive measures, then, have no correct answers, or rather, have only answers that are correct for each individual.

In recent years, there has been an increasing interest on the part of educators in the non-intellectual domain. It is typically very difficult for school personnel or the general public to clearly state what the specific non-intellective goals of education should be and also decide the emphasis placed on such encompassing, but important consequences of schooling. Bloom (1976) and Cronbach & Snow (1977) have indicated though, that these so-called non-cognitive influences also qualify as aptitudes in the sense that they too predict response to instruction, or likelihood of success in a given learning situation, such as cognitive variables purport to accomplish. For example, a student may be intensely interested in a subject like atomic physics and have no problems concerning the learning demands of the material. However, this student may have negative attitudes towards its destructive uses and harbor feelings of fear or anxiety towards its technological potential, and so not pursue advanced knowledge pertaining to this area. Further, Cronbach & Snow (1977) suggested that non-cognitive factors share a number of educationally relevant features with cognitive factors beyond predictiveness. For instance, these non-cognitive characteristics may both serve as mediating or intervening variables, either facilitative or disruptive of subject-matter learning (Messick, 1979). Non-cognitive factors also serve as outcome variables, reflective of educational goals, or valued personal characteristics uninfluenced by educational side effects. Indeed, the noncognitve label applied to such constructs as personality, attitudes and motivation is a misnomer, as they too usually involve salient cognitive components.

Several major theories of these variables in personality and social psychology address such terms as cognitive dissonance (Festinger, 1957), cognitive balance (Heider, 1958), personal constructs (Kelly, 1955), and attributions (Weiner, 1972; Kelley, 1973). The information-processing requirements of task performance even in such areas as self-description, cast cognitive vestiges over such affective constructs as attitudes, feelings, values and motivational variables.

Conversely, such cognitive measures as intelligence, information-processing skills and subject-matter competence often comprise and demand attentional, motivational, socio-cultural and affective frames of reference (Hesburgh, 1979). Weinstein and Fantini (1970) also argued that although cognitive and affective variables are distinct, they are veritably intermeshed. Further, they contend that unless knowledge is related to an affective, or emotional state in the learner, the likelihood that it will be retained, or influence behavior, is limited. A need exists to help children enhance their understanding of self and others and the implications of shared social relationships. This awareness involves more than what can be gathered from an aptitude test or an I.Q. score (Anderson, 1981).

The increasing attention accorded to non-intellective factors by professional educators may have evolved from an attempt by school personnel to ascertain individual student characteristics on a more global level, in an effort to facilitate learning skills and further to be more effective in dealing with classroom behaviour problems (Anderson, 1981). The traditional view advocates that non-intellective

factors including affective and social problems are simply by-products of academic failure. As side-effects, then, they are expected to subside concomitant with remedial progress (Bryan, 1978). However, there is mounting empirical evidence (Bryan & Bryan, 1981) to support the need to treat the affective and social aspects of a student's progress or otherwise as an important and independent area. Yet affective learning, although not completely neglected in the schools, has been slighted. Some changes in affective characteristics have been produced by carefully planned instructional programs such as Tyler's (1973) development of an objective attitude - that is, an increased openness to new ideas, activities, standards and goals. Choppin and Frankel (1976) noted that educational objectives in the affective domain are of great importance, with specific reference to attitudes, as they include the affective reactions which form part of the valuing process. Simonson (1978) summarized the case for the inclusion of objective attitudes in a curriculum when he argued that there were times when it was legitimate and important to persuade learners to accept certain ideas. He continued:

> While the strength of the relationship between attitudes and achievement is unclear, it seems logical that students are more likely to remember information, seek new ideas and continue studying when they react favourably to an instructional activity, or like a certain content area (p. 34)

The promotion of particular attitudes occurs whether teachers are aware of it or not. This forms a part of what is generally regarded as the

"hidden curriculum" of a school. At the very least, teachers need to be aware of this process, to examine their own beliefs, attitudes and values, and to respect those of their students.

The teaching of such concepts as "objective attitudes" to students tends to erode over time, however, possibly due to the difficulty in evaluating the attainment of such objectives (Krathwohl et al., 1964). Educators' fear of indoctrination and a belief that democracy implies freedom of choice are also impeding factors in the teaching of such value - laden constructs. This coupled with the frequently slow acquisition of such intentions by students may account for the lack of planned instructional affective programs in today's schools (Kohlberg, 1973). Klausmeier and Goodwin (1971), however, echo the importance of affective elements in the schools when they suggest that attitudes and values are among the most vital outcomes learned in schools as they determine how individuals react to situations and also what they seek in life. Negative attitudes toward school and school learning have serious consequences for the individual's use of further learning as an adaptive method of dealing with one's own problems as an adult, as well as in part determining one's life style and response to societal change (Bloom, 1978).

The above cited views stress the positive functions of non-cognitive components in educational practice. As previously mentioned, however, the non-cognitive domain is often ignored by educators until indications of negative feedback toward the school become salient. This may take the form of high absenteeism, skipping

classes, alcohol and drug abuse, incomplete assignments and general student apathy, resulting in a lack of communication between school personnel and students. A general lack of knowledge by school personnel of this non-cognitive realm forces them to evaluate these problems as they would typically do in the cognitive sphere, usually with little success. This study is designed to investigate the relationships between these non-intellective factors and high school achievement and their subsequent effects on school performance. This research thus addresses the problem of increasing the accuracy of identifying selected non-cognitive variables as potential predictors of achievement. In this way, the relative merits of both understanding and accommodating these more amorphous influences on the school attainment of high school students may be illuminated.

2. DEFINITIONS, RATIONALE AND HYPOTHESES

2.1 Purpose of the Study

This study attempts to investigate the relationships between non-intellectual factors and high school academic achievement. In so doing, the study hopes to enhance the prediction of academic achievement by studying the contribution of a number of non-intellectual factors to the variance of academic achievement.

These non-intellectual factors include study habits and attitudes, personality, school attitudes and socioeconomic status. Thus, the main focus of the study addresses the question: what is the main influence of the non-intellectual variables studied on high school achievement, and how useful are these variables as predictors of such achievement? The influence of these non-intellectual factors are studied as a group, singly, and in small sub-groups.

2.2 Overview of Instruments

The data pertaining to the non-cognitive factors examined in the study were obtained from:

(a) The Blishen Socioeconomic Index of Occupations (1967). Socioeconomic status is measured by this instrument and is roughly defined as the constraints and opportunities of the social and eocnomically determined learning environment.

(b) The Survey of Study Habits and Attitudes - Form H (Brown & Holtzman, 1967). This test is composed of two basic scales, Study Habits and Study Attitudes. For the purposes of this study, study

habits refer to strategies and use of effective study procedures that can be taught directly to students. Study attitudes provide a measure of scholastic attitudes and beliefs, directly related to the school experience.

(c) The Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975). Personality, as postulated by Eysenck (1967) refers to biologically rooted basic characteristics or major patterns of behaviour in human subjects. This instrument is composed of four scales designated as extraversion (E), neuroticism (N), psychoticism (P) and a lie scale (L). The authors developed and used quite extensively since 1959 a number of questionnaires to measure these dimensions. The EPQ was one of these.

The EPQ in its present form has undergone rigorous standardization procedures and probably no other measures of personality have been as extensively investigated in relationship to mental abilities and scholastic attainment as the Eysenck scales (Block, 1978; Anthony, 1983). A review of the major studies now reveals enough consistency to permit broad generalizations with reference to academic achievement (Jensen, 1973).

(d) The School Attitude Measure (Dolan & Enos, 1980a). The SAM is a self-report questionnaire designed to examine several dimensions of student attitude expression. Prior educational research has demonstrated that these attitudinal constructs are strongly linked to school performance and behaviour (Johnson, 1974; Levin, 1976). The assumption underlying the content of the SAM scales is that thoughts, feelings, interests, and attitudes comprising those

affective characteristics associated with academic learning and school behaviour are interrelated and multidimensional. The attitude scales included in the SAM are:

1. Motivation for Schooling - concerned with students' feelings about the value of school and desire to pursue it.
2. Academic Self-Concept-Performance Based - concerned with students' perception of their ability to learn.
3. Academic Self-Concept-Reference Based - concerned with student's perceptions of how others expect them to perform academically.
4. Student's Sense of Control over Performance - concerned with students' sense of control over school outcomes.
5. Instructional Mastery - concerned with students' self-views with reference to mastery of instructional skills.

2.3 Operational Definitions

Under the five following headings is an overview of the operational definitions of the variables.

1. Personality. Extracted from Eysenck's (1975) dimensions:

(a) Extraversion-Introversion. Refers to idealized end-points of a continuum to which real people may approach to a greater or lesser degree. The typical extravert is sociable and impulsive, while the typical introvert exhibits quiet, introspective, rather solitary behaviour.

(b) Neuroticism. Refers to anxious, worrying individuals, preoccupied with things that might go wrong.

(c) Psychoticism. Refers to solitary, non-caring individuals, often troublesome or aggressive and uncooperative.

(d) Lie Scale. Attempts to measure a tendency on the part of some individuals to "fake-good".

2. Study Habits and Attitudes. In the positive sense, study habits are defined as self-reported student mastery in the use of effective study procedures and efficiency and know-how in doing and completing academic assignments without delay or distraction.

Good study attitudes refers to self-reported student receptiveness and acceptability of school activities, rules, educational objectives and teacher methods.

3. School Attitude. In the positive sense, school attitudes are defined as self-reported student satisfaction with specific dimensions of the school experience such as motivation, academic self-concept and responsibility for their school performance.

4. Socioeconomic status. This refers to self-reported student indicators of their parents' occupations as a measure of social class, determined by a function of the distribution of education and income, linked by this occupation.

5. Dependent Variable. The dependent variable in this ex post facto study is academic achievement as measured by grade point average of grade 12 students. This average is calculated from the combined final grade 11 marks of English 20 and Math 20, extracted from recently written Edmonton Public high school examinations. Grade point average

was chosen, as it is considered to be a more reliable index of general academic performance than the score of any particular test.

2.4 Significance of the Study

It is hoped that this study will answer the questions of concern that some educators have about the relationships between non-intellectual factors and high school performance, and the direct effect that these influences have on students' acquisition of academic skills. If a relationship between these non-intellective variables and achievement can be shown, teachers may attain more understanding as to why a student deviates from his/her expected level of achievement as determined by an I.Q. or aptitude score.

Knowledge of the relationships of non-intellectual factors to academic success may also help school personnel in education decision making. This knowledge will also aid in the enhancement of guidance and placement of students and aid in the identification of high and low achievers for whom new educational environments can be devised to improve their probable achievement.

Finally, as I.Q. does not totally predict academic success, it is hoped that this study will stimulate researchers to further investigation for other variables that might aid in realistically understanding and determining a student's expected achievement level. Chess (1968) claims that temperament and other affective influences must be considered when attempting to understand, manage and teach children in a school setting. She also stressed that optimal school learning takes place when student demands are consistent with his/her capacities

both cognitively and affectively. Learning is impaired however when demands on students are overwhelming and so become a source of stress. Knowledge of all these factors then is important for parents and teachers in their total interaction with the child.

2.5 Limitations of the Study

In this study, it may be considered a limitation that a number of variables which can account for the variance in academic achievement have not been included. These comprise intellectual and aptitude factors such as intelligence and scholastic aptitude, and other non-intellective factors such as interest, persistence, anxiety and creativity.

A second limitation of the study is related to the use of self-report measures. In such measurements of personality and attitudes, respondents are told that there are not right or wrong answers, only answers that are descriptive of them. Some people are undoubtedly quite accurate in their self-perceptions and correct in their self-reports, but we do not have right-answer keys to signify their true attitudes or feelings, only what they have reported. Other respondents will be quite inaccurate in self-report because of tendencies in faking-good, desirability responding, response sets and mechanisms of self-deception and defense. The absence of right-answer keys forces non-cognitive assessment to draw inferences from consistency in response rather than correctness of response, so the psychometric adequacy is in question here and at least questions the reliability of

the study. Eysenck has included a lie scale in his questionnaire to address this limitation.

A third limitation of this study concerns itself with interpretation of data from ex post facto designs. Ex post facto designs are different from true experimental designs in that the treatment is included by selection rather than manipulation. For this reason, it is not always possible to assume a simple causative relation between the independent and dependent variables. If the relationship between non-intellective variables and academic achievement fails to be obtained, then it is likely that no causative relation holds. But, if the relationship is obtained, this does not necessarily mean that the variables studied are causally related. By merely sampling the existence of student characteristics and comparing them to a criterion measure, correlational studies serve a useful purpose only in determining the relationships among measures and not the causes of such relationships. These potential causes can then be tested more directly by manipulation as a further study, but correlational studies, in themselves, are not adequate for cause and effect statements. Thus, the constraints regarding inferences from the ex post facto data certainly poses another limitation of the study.

Intercorrelations among predictor variables pose another limitation in that they can be very difficult in interpret, as the independent variables may not be totally independent. This results in multicollinearity and the attendant difficulty of interpretation.

A fifth limitation is concerned with the sample. This was originally to be composed of all those grade 12 students who had written the departmental examinations of English 30 and Math 30 earlier in the year. A feasibility study, though, indicated that only 30% of the students in the province wrote these examinations, and the overlap of those writing both English and Math was not sufficient or practical for sample gathering. Therefore, teacher awarded marks from school examinations were used as the criterion for this study. Although teacher awarded marks in the Edmonton Public School Board were found to be very similar to provincial results, the provincial examinations were standard throughout the province, and so would have served as a control factor in themselves. To indicate the similarity of teacher and provincial marks regarding the E.P.S.B., the average school mark for English and Math was 61.5% and 63.8%, respectively. The average government marks for these subjects was 61.1% and 61.8% respectively.

Finally, one of the goals of research is generalizability, and the fact that this study took place in Edmonton, a relatively large urban center with the sample coming from one school board, could certainly raise questions regarding any generalizations to be made. Sample self-selection rather than random selection characterizes this type of study. The results may certainly be different if applied to a more rural or even a more cosmopolitan type of setting. All generalizations are made in light of this limitation.

2.6 General Rationale

There is much more to scholastic achievement than intellectual ability, important as such ability seems to be. However, early research on predictors of academic achievement tended to focus primarily on intellectual and ability factors, and as a consequence gave only a partial picture of the success of students in high school and university.

The affective domain, which is related to students' attitudes, interests and emotional and personality responses have tended to be neglected. One factor influencing such neglect is the lack of appropriate measuring instruments for such variables. Thus, this study hopes to redress this neglect by focusing on such neglected variables, in the hope that the results may enhance prediction of academic success.

2.7 Specific Rationale

This study will examine the hypothesis that selected non-intellectual factors will be significantly related to academic performance at the high school level for both males and females. The literature examined, does in fact, demonstrate that differential non-cognitive variables do correlate with high school grades (Jordan, 1981; Cappela et al., 1982). Numerous studies on academic prediction might be summarized by stating that the average relationship between cognitive variables and achievement criteria ranges between .50 and .75 (Weiner, 1972; Khan, 1966; Handel, 1975). Therefore, one half to three quarters of the variability in achievement remains unexplained. As a result, there has been substantial research on the importance of

non-intellectual factors (Verma, 1978; Zarb, 1981; Applegate, 1981). This research study hypothesizes that such factors as social class, personality and school attitudes all affect one's level of academic achievement. There is however, much inconsistency in the literature regarding the status of these variables.

In this study, the choice of non-cognitive variables was made carefully to include personality, study habits, school attitudes and socioeconomic status. These specific variables have been shown to be positively associated with different measures of achievement, and so, enhance the variance unexplained by intelligence and aptitude factors. There is still some confusion, however, as to the amount of this variance they occupy (Uguroglu & Walberg, 1979). Many researchers have used bivariate research designs involving only one independent variable and its influence on academic achievement. An example of such a study might be the relationship between personality and achievement. This study adopts a multivariate approach in which a number of independent variables will be examined simultaneously, individually and in small subgroups to identify their relationship to academic achievement.

Regarding personality, prior research has indicated that at the secondary school level, introverts will outperform extraverts and neurotics on academic measures (Entwistle, 1972; Warburton, 1968). Although extraversion is generally seen to be detrimental to academic success in high school, the case is less clear for neuroticism, although most studies have reported low positive or non-significant relationships (Furneaux, 1962; Kline & Gale, 1971). The dimension of psychoticism is

rather obscure in the literature in that few studies have been published about its nature. Goh and Moore (1978) did suggest that psychoticism would exert an impeding effect on academic performance, but clearly, a need exists for further research aimed at providing more knowledge and less ambiguity about these relationships.

With regards to study habits, study attitudes and school attitudes, previous findings have generally found significant relations between these variables and measures of school performance (Aiken, 1970; Robyak & Downey, 1979). However, some research has failed to confirm this relationship (Jackson & Lahaderne, 1967), while others have found attitudes to be related to school performance when measured by teacher grades, but not by standardized tests (Malpass, 1953). Attitudes towards the self as a learner are important educationally and enhancement of school self-concept and its positive relationship to school success is generally viewed as a central educational objective (Purkey, 1970; Shavelson, Hubner & Stanton, 1976). Because of the somewhat conflicting nature of these findings, there seems to be a need for further research here to help further illuminate and clarify the influence of an individual's study habits and feelings about school with regard to academic success.

With respect to socioeconomic status, past studies have revealed that low SES is associated with poor performance in the educational area (Deosaran, 1978; Passow, 1963). Lower grade-point average in high school, and subsequent less rewarding financial careers was also noticed by Bender and Ruiz (1974). On the basis of these relationships, there

seems to be significant justification for more clarity regarding SES and achievement at the high school level, where important career decisions are often made affecting the student's life patterns in rather enduring ways.

Clearly, as the research evidence indicates, I.Q. does not totally predict all the variance in academic achievement. There is ambiguity and confusion in the current research literature and a definite need exists to find other variables to complement cognitive predictors that might aid in giving a more accurate basis of a student's expected achievement. There is also a need to enlighten school directors about the relevance of these affective components. In this way, these officials will better appreciate the impact of such variables not only on grades, but also such factors as school atmosphere, student satisfaction and the relationships between teachers and students.

Inconsistent results in previous literature on non-intellectual factors may have been in part due to researchers' attempt to look at the relationships of these variables to school performance separately and singly. The trend now, though, is to look at academic achievement and its relationship to many variables (Zarb, 1981; Lao, 1980; Verma, 1978). The literature, however, shows no studies offering the simultaneous exploration of personality, study habits, study attitudes, school attitudes, and socioeconomic status as a complete package. This study is unique in this way, and hopes to offer a clearer picture as to how these factors work singly and together for each of the two sexes, as

well as have a total effect on the actual school achievement of a high school sample.

2.8 Research Hypotheses

As a result of the review of the literature, the following hypotheses have been generated.

1. Extraversion will be inversely related to academic performance, that is, subjects with high extraversion scores will have lower academic achievement than those who attain lower scores.

2. Neuroticism will be positively related to academic performance, that is, subjects with high neuroticism scores will have higher academic achievement than those who attain lower scores.

3. Psychoticism will be inversely related to academic performance, that is, subjects with high psychoticism scores will have lower academic achievement than those who attain lower scores.

4. School Motivation will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic achievement than those with lower scores.

5. Self-Concept, Performance will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic achievement than those with lower scores.

6. Self-Concept, Reference will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic achievement than those with lower scores.

7. Control Over Performance will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic achievement than those with lower scores.

8. Instructional Mastery will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic achievement than those with lower scores.

9. School Study Habits and Study Attitudes will be positively related to academic performance, that is, subjects with high scores on these scales will have higher academic achievement than those with lower scores.

10. Socioeconomic Status will be positively related to academic performance, that is, subjects with high socioeconomic indices will have higher academic achievement than those with lower indices.

2.9 Research Design

This study involves an ex post facto research design, in which the researcher, rather than creating the treatment, examines the effects of a naturalistically occurring treatment, after that treatment has occurred (Tuckman, 1978). The design involves relating an after-the-fact treatment to an outcome or dependent measure. The treatment is included by selection rather than by manipulation.

According to Kerlinger (1979), ex post facto research is any research in which it is not possible to manipulate variables or to assign subjects or conditions at random. Thus, the design of this study is essentially non-experimental.

In accordance with the criteria for ex post facto research designs, this study included the following elements.

(a) The criterion or dependent variable is defined operationally as the average performance on the final grade 11 English and Math exams given by the Edmonton Public School Board. There is only one dependent variable.

(b) There are four predictors or independent variables, personality, study habits and attitudes, school attitudes and SES. These are operationally defined by the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), the Survey of Study Habits and Attitudes--Form H (Brown & Holtzman, 1967), the School Attitude Measure (Dolan & Enos, 1980a), and the Blishen Socioeconomic Index of Occupations (1967).

(c) Non-random sample selection of English 20 and Mathematics 20 grade 12 students was further subdivided into female and male subgroups. This refines the design and so enhances interpretation of the results.

2.10 Data Analysis

Data were analyzed using a multivariate approach as the study involved one dependent variable and four independent variables. Since the aim of the study was to predict achievement and study the effects of the independent variables on achievement, a multivariate approach was justified. Kerlinger (1979) considers any situation in which there are two or more independent variables, and one or more dependent variables

as multivariate. According to Kerlinger (1979), one form of multivariate approach useful for the type of data analysis indicated in this study is Multiple Regression Analysis. He claims that this analysis expeditiously and efficiently analyzes situations involving shared variance as seen in this study.

Since multiple regression is a general statistical technique through which one can analyze the relationships between a dependent or criterion variable and a set of independent or predictor variables, it was used to analyze the data of this study.

The data analysis of the study was based on the following null hypotheses:

1. There is no inverse relationship between extraversion and high school academic performance.

2. There is no positive relationship between neuroticism and high school academic performance.

3. There is no inverse relationship between psychoticism and high school academic performance.

4. There is no positive relationship between school motivation and high school academic performance.

5. There is no positive relationship between self-concept, performance and high school academic performance.

6. There is no positive relationship between self-concept, reference and high school academic performance.

7. There is no positive relationship between control over performance and high school academic performance.

8. There is no positive relationship between instructional mastery and high school academic performance.

9. There is no positive relationship between study habits or study attitudes and high school academic performance.

10. There is no positive relationship between socioeconomic status and high school academic performance.

3. LITERATURE REVIEW

3.1 Affect and Achievement

Affective learning is concerned with the emotional aspects of one's behaviour, the influences on our choice of goals, and the means we choose for attaining these goals (Krathwohl et al., 1964). These elements include our emotions, our tastes and preferences, attitudes, values, morals and guiding principles of life. Although it is difficult to differentiate completely affective characteristics from other human characteristics, they possess certain critical features: they are typical ways of feeling, they have some degree of intensity, they have direction and are usually directed toward some target such as an idea, activity or object (Anderson, 1981).

School personnel, psychologists and social workers have long been aware that students experiencing academic difficulties manifest different combinations of both academic and non-academic characteristics, and that different types of student profiles may be identified, indicating different strategies of intervention. However, there has been an increasing research interest concerning the relationship between the affective, non-academic characteristics of students and their academic performance (Ainsworth, 1974; Rubin, 1978; Lao, 1980; Diesterhaft & Gerken, 1983). The discovery that intellectual ability is only one of the determinants of academic performance is of course not all that recent (Cattell et al., 1966; Eysenck & Cookson, 1969), although most of the related research has been directed at the

cognitive domain, due to the lack of consistent and conclusive findings regarding affective correlates of school achievement (Brodie, 1964; Lavin, 1965; Handel, 1975).

In the past, no systematic attempts were made to gain knowledge of affective characteristics of students. To a large extent, this neglect of the affective doman reflected the belief of many people in contemporary western society that the schools should teach reading, writing and arithmetic and stay out of such areas as attitudes and values (Ringness, 1975). Such people felt that affective behaviour is not the concern of the school and should remain in the provence of the family and the church (Anderson, 1981).

Today, however, educators recognize that although the home and other non-school institutions still have important roles to play in affective learning, there are objectives in the affective domain such as increased school motivation and more positive school attitudes that are appropriate to the educational functions of the school and college. It is important to note that educators recognize that these affective objectives are not automatically attained when students develop relevant cognitive knowledge. Hence, a need exists to devise instructional programs to foster the development of such affective outcomes. However, little has been accomplished in the schools to promote such student self-exploration with particular reference to self-direction, gaining independence, assertiveness training, or decision-making (Tyler, 1973). Holt (1964) indicates that educators do not adequately consider such affective behaviour and he further suggests that school children are

more often than not, anxious individuals. Their classroom efforts seem to be more defensive than constructive, and consequently their learning efficiency is impeded. Ringness (1968) suggests that the de-emphasis of affective teachings deprives children of their natural spontaneity to enjoy learning. The incidental learning going on in many schools as a result of grading, grouping, disciplinary, and other stress producing practices contributes to both emotional and social maladjustment. Ringness further contends that the bright child of middle or higher socioeconomic status who conforms to the demands of the teacher will fare best in our schools, but even he or she would appear to be trained rather than educated.

The recurrent theme involving the attempt to unravel the complex determinants of academic attainment and the growth of dimensional theories of personality (Eysenck, 1970) has drawn attention to the importance of such non-intellectual factors. As a result, numerous studies have been conducted on the relation between school achievement and school related affect including selected personality characteristics, self-concept, school attitudes and achievement motivation (Keeves, 1974; Phares, 1976; Uguroglu & Walberg, 1979; Shavelson & Bolus, 1982). The results of these studies, especially for students at the extremes of school achievement, have indicated a relation between positive and negative school affect and indications of adequacy or inadequacy in school achievement. Cattell et al. (1966) have stressed the importance of investigating non-academic variables by suggesting that ability, temperament and motivation each contribute

something like 25% to the achievement variance. Weiner (1972) also indicated that intelligence accounts for only 25 to 40% of the observed variance in grade level, whereas Brown & Holtzman (1966) have indicated that study habits and study attitudes account for about 15% of the variance, with motivation accounting for another 12% of the variance in high school performance. These statistics lend support to the notion that other variables besides intelligence and aptitude affect school attainment. A search then for other correlates such as social class, self-concept, study habits and general personality traits is necessary in order to identify factors which may improve the prediction of achievement unexplained by intelligence alone (Cattell & Butcher, 1968; Barton & Dielman & Cattell, 1972).

There seems to be a general consensus that many and diverse non-intellectual factors do in fact contribute to the variance in academic performance. However, little consensus exists as to which variables are in fact significant, or to what portion of the variance they encompass (Marjoribanks, 1977). Research results which examine non-academic influences on achievement are generally contradictory making comparisons across studies very difficult. Different measuring instruments, dissimilar sample characteristics and the equivocal nature of both the predictor variables and criterion add to the difficulty (Middleton & Guthrie, 1959; Mintz & Muller, 1977; Scheirer & Kraut, 1979). These apparent contradictions and inconsistencies among findings concerning the relationships between school related affect and academic

achievement indicate the need for further research on this issue (Khan, 1969).

3.2 High School and Academic Performance

There seems to be a firm belief in western society today that schooling is essential for future occupational success and upward social mobility, both of which are highly valued. Secondary schools play a diverse social role as they not only develop the cognitive capabilities of students, but are also given considerable responsibility for developing attitudes, values, expectations and skills that will prepare students for adult social and occupational roles (Spady, 1974). In addition, high schools sort students into social strata that determine or restrict social or occupational opportunities (Krug, 1969). Finally, high schools perform evaluation functions by providing certificates of educational attainment as well as performing custodial functions by assuming control over students within the jurisdiction of the school. The principal notion here is that secondary schools have several functions to perform and the adolescent entering high school should therefore expect to be more than "academically" prepared. Considerable time is spent by schools - acting in "loco parentis" - socializing students in a variety of ways.

In light of the roles that the school is expected to play in the community and for the development of youth, it is not surprising that the school has attracted the interest of researchers from various disciplines. Most observers concede that what is learned in high school probably inyolves much more than what is contained in the

curriculum (Bidwell, 1965; Coleman, 1965). Yet there is considerable lack of information about the nature and quality of the "noneducational" outcomes of schooling and marked skepticism among researchers and educational reformers about the actual contributions of the high school with reference to "social learning" (McClintock, 1979). Patricia Sexton (1967), for example, expresses the opinion of a substantial group of investigators when she suggests that the contribution of the school to total learning is a matter of speculation rather than certain knowledge. Sexton further indicates that with the competition of other media and peer relationships, it may be that little of significance is learned in high school.

Low academic performance at the high school level is a complex problem and although school performance can be affected by personality and motivational factors in the early grades, these intervening variables seem to take on a greater significance when the student reaches adolescence (Zarb, 1981). The school, in this case, serves as a context within which to view student affective characteristics. Tyler (1973), and Anderson (1981) have suggested that any affective characteristic that may be related to students' classroom behavior or involvement in the learning process, and ultimately learning, may be seen as significant input to the schooling process and so of legitimate concern to the educator. Adolescents seem to enter school situations possessing various affective characteristics like positive or negative school attitudes, outgoing or withdrawn dispositions, and varying school interests and enthusiasm to complete their studies. It is likely that

their behavior and performance in these settings will be consistent with these characteristics (Klausmeier & Goodwin, 1971).

Educators are well aware that below average test scores in such subjects as reading or math usually reflect more than just academic factors. Study habits, school attitudes and personality traits have all been shown to affect achievement in more or less equal proportions (Khan, 1966). However, seldom is a factor other than I.Q. ever used for prediction of success in a student by these officials (Eysenck, 1965). These relevant attitudinal and motivational characteristics significantly influence academic performance in that students possessing more negative characteristics tend to be less attentive, less persistent, more disruptive and so achieve less. Conversely, students possessing more positive characteristics in these areas tend to achieve more, even when student aptitude is low (Khan, 1970; Verma, 1978).

Recently, schools have been criticized for their failure to meet the developmental needs of youth, such as autonomy and self-esteem (Poole, 1984), and to prepare young people for their future adult roles in work, leisure, and as citizens (Anderson, 1980). Toomey (1975) suggested that schools emphasis on good grades has left a serious void in such areas a intrinsic motivation, interest, direct experience, sense of control, and most importantly self-esteem.

Other studies (Lasseigne, 1974; Thompson, 1975) indicated that performing well in secondary school was a primary concern of adolescents and that certain facets of school life seemed to be more problematic than others. They further suggested that these problems involved more

than just a lack of success and achievement as measured by tests and grades. More significant was the lack of interesting class assignments, poor student-teacher relations and distressing interactions with their friends.

Improvement of schooling and school effectiveness continue to be popular endeavors among educators, although less success has been realized at the secondary level, than is apparent in elementary school (Seifert & Beck, 1984). In a recent Phi Delta Kappan (Murphy, 1983), Eleanor Farrar, vice president of the Huron Institute, indicated that school reformers have bypassed the more complicated secondary schools. Consequently, there has been little change in high schools resulting in little improvement. Understanding how the adolescent sees his or her world may help professionals achieve insight and take appropriate action to help students solve problems, cope with frustrations and improve academically (Murphy, 1983).

So, the knowledge and appreciation of educators with reference to the impact of non-intellectual factors on high school achievement may help them determine the level of expected performance for each student rather than relying entirely on an I.Q. score. Important educational and career judgements are then based on more than just a single piece of information.

3.3 Personality and Academic Performance

During the last two decades, evidence has continued to accumulate suggesting that in addition to intellectual ability, some relationships exist between personality variables and academic achievement (Jensen,

1973; Naylor, 1972). Many studies in this area have reported findings based on the theory of personality advanced by Eysenck (1970). According to Eysenck (1967), personality is that innate force which integrates a person's behaviour, adjusts one to his/her environment, and activates one's feedback response to the reactions of individuals. Stability and consistency over time are salient characteristics of the concept of personality although Bloom (1965), however, suggests that allowance should be made for some degree of change as part of one's individual development. Eysenck (1955) maintains that personality is not just a collection of sensations, motives and memory traces, but is the most complete expression of wholeness in man. Thus, it cannot be neglected in any assessment of the child, particularly in the school situation.

Fundamentally, Eysenck is a type theorist and is therefore concerned with dimensions of personality or a small number of orthogonal second order factors rather than dealing with many traits like Cattell (1966). These bio-social factors constitute the descriptive element of the theory and are of significance for the definition of personality as used in this study. Eysenck initially adapted Jung's terminology of introversion-extraversion, but unlike Jung, Eysenck employed factor analytical methods and found extraversion to be orthogonal to neuroticism. Also, unlike Cattell, Eysenck transcended the descriptive component of his theory by advancing a formulation of the processes which clarify the obtained dimensions. This causal element of the theory has a distinct biological infusion and is rooted in a conception

of genetically based differences in the functioning of the central and autonomic nervous systems. In this way, Eysenck's theory is both descriptive and biological and includes the orthogonal personality dimensions of introversion-extraversion, neuroticism and psychoticism. The personality dimensions of extraversion and neuroticism have been postulated most frequently as contributing to academic performance.

Concerning introversion-extraversion, Eysenck operationally defined these factors as descriptive terms denoting two types of behavioural reaction and personality organization. Extraverted behaviour is portrayed clinically by the outward expression of feelings and attitudes in words, gestures and acts, in a spontaneous and direct manner unimpeded by reflection, indecision or reserve (Eysenck, 1971). According to Eysenck, the typical extravert is social, likes parties, needs people to talk to, but is restless and impulsive and not likely to read or study alone. The typical introvert, on the other hand, is described as a retiring, introspective person who enjoys reading and studying alone. Introverts do not like excitement, are reliable and tend to plan ahead, distrusting the impulse of the moment. Eysenck characterizes neurotics as anxious individuals, who seem to worry about almost everything, whereas psychotics are described as solitary, uncaring people, somewhat hostile and altogether insensitive.

Eysenck's theory has generated a considerable amount of research regarding school learning as these personality-based behavioural differences exert important influences. Introverts are postulated to have higher levels of cortical arousal than extraverts, who develop slow

and weak excitatory potentials. In this way, introverts are at an advantage in school learning as reactive inhibition is not so quickly formed and so the learning process is not as disturbed. This results in more concentration and for longer periods of time. Recent reviews of major studies have confirmed Eysenck's theory as a number of investigators have found low but positive correlations between extraversion and scholastic achievement of primary school children (Savage, 1966; Ridding, 1976; Entwistle & Cunningham, 1968). With reference to introversion, however, researchers have reported rather firm statistically significant positive relationships with achievement among high school and university students (Kelvin, Lucas & Ljha, 1965; Lavin, 1967; Entwistle & Wilson, 1970).

Concerning neuroticism however, the relationship to achievement is less well established. Some college studies have found low, but positive relationships (Lynn & Gordon, 1961; Furneaux, 1962), whereas other studies have reported negative (Lavin, 1967), or non-significant relationships between the two (Kline & Gale, 1971). Among primary school children, however, high N scores are linked to poor academic performance (Rushton, 1966; Entwistle & Cunningham, 1968). According to Eysenck (1967) neurotics display high emotional rather than intellectual drive in their behaviour, unlike stable subjects who show low drive. Piaget (1967) indicated that the role of neuroticism or emotionality can be considered as the force that energizes behaviour, whereas extraversion directs such behaviour.

Entwistle (1972) reported, after a thorough review of the literature, that age might be an important variable in interpreting results. He concluded by suggesting that at the later secondary and university level, introverts are more likely to perform better than extraverts. However, at the early secondary and primary school level, the stable extravert is likely to outperform the unstable introvert. This age trend was also revealed in a detailed review by Warburton (1968). He suggested that up to the age of 15, anxiety is seldom an advantage, but after this age, introverts will usually outperform both extraverts and neurotics on achievement measures (Orpen, 1976).

Concerning psychoticism and achievement, very little research has been published in the literature, but, Goh and Moore (1978) using the Eysenck Personality Questionnaire (1975) did show negative correlations suggesting a possible impeding effect of psychoticism on achievement at three educational levels, university, vocational, and high school.

Finally, Eysenck and Cookson (1969) suggested that boys and girls may show quite different regressions of achievement or ability on personality variables and so they emphasize the need for treating the sexes separately.

3.4 Study Behaviour and Academic Performance

The importance of good study skills in academic achievement is a basic belief of teachers and school personnel, and one that is supported by the literature. For example, Brown and Holtzman (1966), on the basis of several studies with college students, reported an average

correlation of .36 between their score on the Survey of Study Habits and Attitudes (SSHA) and grade point average.

Public education is under scrutiny as never before and so it seems reasonable to expect that teachers and parents should renew their search for easily manipulable variables that will improve student achievement. One such manipulable variable is home-work, or the amount of efficient time a student spends studying outside of class. Reviews of related research indicate that study skills (Lavin, 1965) and time variables (Fredrick & Walberg, 1980) including homework, years of schooling, attitudes, and in-school learning time, predict achievement at modest levels even after controlling for such background factors as ability. Other studies of the effect of study time on achievement have produced contradictory results. Wolf (1979) found homework time to be substantially related to achievement, whereas Wagstaff and Mahmoudi (1976) found hours of study per week to be the third best predictor, after I.Q. and assignment completion, adding only 5% to the explained variance of exam grades.

A study by Cappella et al. (1982) attempted to explain more of the variance of study behaviour on achievement by administering the Brown-Holtzman study habits and attitudes scale (1967), rather than just using students' self-reported study time. This scale incorporates more detailed knowledge of study skills and efficiency in completing assignments than just a record of number of hours devoted to homework. Results of this study indicated a correlation of .46 between grade-point average and the scores on the SSHA, which is larger than the

correlations reported in previously cited studies. These findings are important when the distinction between self-reported study time and study behaviour are understood. Although it is useful to consider the actual amount of time a student devotes to study, the student's efficiency and knowledge of how-to-study determine the productivity of that study time.

Lin and McKeachie (1970) also indicated that student study habits contribute to academic performance independent of aptitude, whereas Entwistle and Wilson (1970) found a recognizable interaction between study methods, motivation and personality type--introverts showing consistently higher scores on both study methods and motivation than extraverts.

In a follow-up study, Robyak and Downey (1979) indicated that underachievement appears to be a function of deficits in study skills as well as a tendency to direct actions externally toward people and things, suggestive of extraversion. An introvert's best work, conversely, is accomplished through reflection, so it could be argued that internally oriented people do not necessarily have to use study skills to the same extent as extraverts to acquire the concepts and ideas of their academic classes. The interpretation here is that both study skills and students' personality characteristics are important considerations when examining their association to achievement.

A study by De Vito, Tryon and Carlson (1983) employing the Survey of Study Habits and Attitudes was interesting in that freshmen college females scored significantly higher in both study habits and attitudes

than men. This was not surprising, however, as a number of studies have shown that women generally have more positive attitudes toward their education than men (Alexander & Eckland, 1974; Lueptow, 1975) throughout their schooling.

In their review of students' study behaviour and achievement gain, Seifert & Beck (1984) observed that study time does not really improve academic achievement. They indicated that most students achieve very little when given homework to complete without direct supervision. Students spent more time-on-task behaviour when teachers were in direct control of instruction. Predictably, students in high school appear to achieve optimally when they are listening and thinking and being challenged by the teacher.

It seems clear, from the somewhat conflicting nature of these findings that additional up-to-date research is needed regarding the relationship of study habits and attitudes to academic attainment. More information on the effects of efficient study skills and high school success would be of value both in the practical or school sense, and in the theoretical or research area as we endeavor to search for the significant influences of school performance.

3.5 School Attitudes and Academic Performance

In this study, attempts to more fully understand the complete causal chain associated with school performance include the effects of school attitudes. Unlike feelings, attitudes are always directed, positively or negatively, toward some social object and so include an

enduring predisposition to behave in a consistent way toward this object (Scott, 1968).

Educationally relevant attitudes include orientations toward learning, school and teachers, subject matter, and the self (Bloom, 1976). An attitude is a step further to generalization, internalization, centrality to the self, and significance to both self and society. Klausmeier (1971) suggests that attitudes are emotionally toned predispositions to react in a consistent way, favorably or unfavorably, toward a person, object, or idea. He further suggests that attitudes are quite stable, for example, one may feel favorably or otherwise about education, and this attitude tends to continue over time. Krathwohl et. al. (1964) indicate that attitudes have a cognitive as well as an affective component. That is, they are not simply composed of feelings for or against something, but include intellectualization as well. One may feel quite strongly about the value of the rights of students, but at the same time possess a cognitive ability to verbalize these values, to defend them logically, and to state how they are arrived at.

The concern of educators for positive attitudes in students is typically justified on one of two perspectives. The first argument is that general school attitudes influence student achievement. The more positive the attitudes, the better the achievement, although this attitude-achievement association is generally reported to be rather weak, with a mean correlation for 43 studies of .16 (Willson, 1981). The second argument is ideological and contends that positive student

attitudes towards school and learning is in itself one of the most important goals of education (Ringness, 1975).

Although there have been many other investigations of the relationships of school related attitudes of children and academic achievement, the findings remain both inconsistent and inconclusive. For example, Johnson (1974), Aiken (1970), and Marjoribanks (1976a) found significant relations between school attitude scores and measures of high school performance. In an earlier study, however, Malpass (1953) found that school attitudes of students or affective commitment towards school was related to achievement when measured by term grades, but not related when measured by standardized achievement tests.

Jackson and Lahaderne (1967) found no significant relations between attitude scores and achievement, whereas Levin (1976) suggests that education programs focusing on student attitudes exert a pervasive influence and may be able to compensate for cultural disadvantages. Such background factors as social class and ethnic background have their direct effects not only on achievement, but on attitude, which directly affects such achievement.

The equivocal nature of the above findings investigating relationships between attitudes and academic achievement suggest a definite need for more research in this area, so that we might be more able to unravel these complex associations for a better understanding of human learning.

3.5.1 Motivation and Achievement

Motivation is generally thought to be a prerequisite of learning, especially complex cognitive learning (Clifford, 1981). When one speaks of motivation, one is discussing the factors that drive and orient behaviour toward a certain goal - in this study, the goal of academic success and achievement. When studying motivation, educational psychologists are concerned most with the factors associated with students' desire to learn academic skills or factors that inhibit such learning. Of course, academic skills are just one set of goals that students can be motivated to attain. Other goals may include self-awareness, peer acceptance or physical achievement (Royer & Feldman, 1984). The concept of motivation is thus used to explain how behaviour is directed and sustained to achieve a particular goal (Fanelli, 1977; Lefcourt, 1976). Since a motive may be defined as any impulse or emotion that impels one to action, almost all the noncognitive variables under discussion here may qualify as motivational to some degree. The cue and drive producing properties of attitudes then lead to selectivity of attention and increase arousal and energy of action tendencies (Doob, 1947). Motivation for school then may influence or direct a student as to how hard he or she wants to work at academic pursuits, or how highly one values school and how interested one is in pursuing further schooling.

Motivation initiates, maintains, and controls the extent and direction of behaviour. In school, motivation is an important factor of learning, along with intelligence and previous background learning

(Ringness, 1967). Motivation is a factor in discipline, pupil adjustment and classroom relationships.

The first systematic approach to develop the concept of achievement motivation was initiated by McClelland et al. (1961). He defined it as a learned motive, unconscious in nature, resulting from rewards or punishment of specific behaviour. He further indicated that achievement motivation is formed in early childhood experiences, and that parents who teach independent mastery, a sense of competition, and reward such behaviour are giving their children achievement training. A review of the research literature divides the notion of achievement motivation into two distinct camps. Some theorists believe that the need to achieve is usually perceived as a single unitary concept, possessed by some and not by others (Castenell, 1980). Other investigators have questioned this premise saying that achievement motivation is common to all groups and situational in nature (Katz, 1969; Maehr, 1974). For example, one may be motivated to achieve in sports, but not in the classroom, or experience a need to achieve in school today, but not tomorrow. This situational factor along with expected group differences may partially explain why research on race, sex and class variations remains inconclusive. The one common belief of all theorists is that the achievement orientations and behaviour of adolescents are important variables in understanding outcomes.

A study by Chadwick and Bahr (1976) found achievement motivation to be the best predictor of academic achievement for Indian high school students. Other predictors used in this study were self-concept,

culture conflict and family instability. The researchers further recommended that these predictors serve as target variables in programs designed to improve academic performance.

A quantitative synthesis study by Uguroglu and Walberg (1979) estimated the typical correlation between measures of motivation and educational achievement. The correlations from a calibration sample of 22 studies and a validation sample of 18 studies were analyzed using analysis of variance and regression techniques. Motivation factors were restricted to general and academic self-concept, locus of control and achievement motivation. The dependent variable here included achievement, ability tests and grade-point-average. The results indicated that for grades 1-12, 232 uncorrected observed correlations showed a mean of .338 or 11.4% of the variance accounted for in achievement by motivation factors. Grade level emerged as the only significant student feature, as motivation and achievement were more highly correlated in students in later grades. Further research may enhance our knowledge and prediction of motivation regarding academic performance and other school pursuits.

3.5.2 Academic Self-Concept and Achievement

Attitudes toward the self, especially the self as a learner, are important educationally as both instrumental and outcome variables and have been widely examined under the rubric of academic self-concept (Wylie, 1974; Shavelson et al., 1976). Although the results from many studies have revealed a significant relationship between self-concept and achievement (Kifer, 1975; Primavera, Simon & Primavera, 1974; Rubin,

1978), there have also been studies showing no significant relationships (Chang, 1976; Husak & Magill, 1979). Brookover et al. (1964) suggest that inconsistencies in this research are due more to the instruments used than to theoretical complexities. Mintz and Muller (1977) agreed with Brookover in that they indicated that academic self-concept measures are more closely related to academic achievement than either global self-concept measures, or specific measures of a child's school experience, such as peer relations or maturity.

The self-attitudes of students directly affect their learning in the classroom, their interactions with teachers and peers, and indeed, every aspect of their school lives (Bloom, 1976). The self-concept is formed cognitively, mainly from the feedback one gets from others. It is affective, though, in the sense that one is pleased or otherwise with this feedback. It tends to become internalized in an individual, who in turn evaluates his or her self as adequate or inadequate, acceptable or unacceptable, and so on in other dimensions, each of which has emotional dispositions (Tomkins & Izard, 1965).

Interest in self-concept stems from both its recognition as a valued educational outcome and the assumption that the improvement of self-concept may lead to improvements in academic achievement (Burns, 1979; Wylie, 1979; Rogosa, 1980). Purkey (1978) indicated that self-evaluations are basically the products of how we think the significant people in our lives perceive us. Wells and Marwell (1976) pointed out that the notion of "significant others" is crucial here. If the student is not well acquainted, or does not feel this external

person has a vested interest in the student's personal welfare, then the concept of "significant other" will not apply. Such a person, then, will have little effect on a student's academic self-concept.

A study by Shavelson, Hubner and Stanton (1976) also suggests that self-concept is formed by one's experience with, and interpretations of one's environment. Self perceptions are especially influenced by reinforcements, evaluations by significant others, and one's attributions for one's own behaviour.

A recent study by Hansford and Hattie (1982) used meta-analysis to examine the relationship between various self-concept measures and measures of performance and achievement. The statistical results of 128 studies were transformed into a common measure, correlation coefficients. A total sample of 202,823 persons were included in this analysis and produced a data base of 1,136 correlations between self-ratings and performance measures. The average correlation here was found to be .21, with a range in the relationship of -.77 to .96. It was found that these relationships were modified by such variables as subjects' grade level, socioeconomic status, ability of subjects, and type of performance or achievement measures.

Perhaps desire for approval and fear of rejection remain constant concerns throughout adolescence, as high school students come in contact with other students daily. These students are continually being judged relative to each other, likewise, the student is always self-evaluating against personal standards established by teachers, peers, etc. This focus may lead to a form of social evaluative anxiety which impedes

successful peer interaction and culminates in social isolation and peer rejection, which adversely affect academic performance (Warren, Good, & Welten, 1984). The classroom is not a closed system and factors outside the school such as home and peer-group environment influence students' achievement, classroom climate and responsiveness to instruction, so that a predisposition to learning is also affected by such external and differential components (Walberg, Singh & Tsai, 1984).

3.5.3 Locus of Control and Achievement

Locus of control was originally conceptualized by Rotter (1966) as a cognitive-perceptual variable, or an expectancy. Rotter states that this concept in essence refers to a person's internal and external control of reinforcement. This social learning theory essentially states that persons who hold an expectancy of internal control perceive events or consequences as contingent upon their own behaviour. Those, however, with an external perception fail to see the connection between their efforts and their consequences (Sherman & Hoffman, 1980). Relevant to education, students who believe that their marks are dependent upon their own behaviour and attributes tend to be more self-motivated and so achieve higher than those who believe that outcomes are contingent on luck, fate, chance or powerful others (Maqsud, 1980; Bar-Tal, Kfir, Bar-Zohar & Chen, 1980).

The research on locus of control and achievement has included diverse instruments and populations, but the results of the studies conducted with students in regular school programs have generally indicated significant positive correlations between achievement and

internality (Barnett & Kaiser, 1978; Clifford, 1976; Douglas & Powers, 1982). On the whole, the available research has also yielded some conflicting results. Lefcourt (1976) after reviewing several studies states that the relationships between various measures of locus of control and achievement behaviours are often riddled with inconsistent and diverse results. He further suggests that these inconsistencies may be in part due to the type of achievement being measured. Shea (1976) considered achievement to be represented by standardized achievement tests, or as a momentary event, whereas other researchers (Crandall, Katkovsky & Crandall, 1965) saw achievement as grade-point average or a continuing state, typical of a student's ongoing school experience. Sherman and Hofmann (1980) indicated that interrelationships of grade-point average with locus of control would be more evident than associations of standardized achievement with the same.

Beliefs about what causes one's own behaviour serve as cognitive mediators and so influence subsequent behaviours such as persistence, motivation or attitude. Students often attribute their academic success or failure to either effort, ability, task difficulty or luck. These attributions are motivators in as much as one will avoid that to which failure is attributed and pursue that to which one attributes success (Weiner, 1979). Teachers' feedback as formative or summative evaluations (Bloom, Hastings & Madaus, 1971) may provide the necessary reinforcement or lack thereof to shape and influence a student's perception of controlled causality. In this way, those students who feel they have control over success continue to try, but more

importantly, those students who feel that failure is beyond their control, do not stop trying.

3.5.4 Socioeconomic Status and Academic Performance

Social class is a category that indicates a person's economic and social standing relative to other individuals. It is measured in different manners including family income, parents' occupations and family living conditions (Clifford, 1981). People commonly speak of low, middle, upper-middle and high social-economic status. The social class membership of a student has important implications for his/her school achievement, aspirations for academic success, achievement motivation and attitudes toward school (Bender & Ruiz, 1974). Children and parents from lower-class homes tend to hold lower expectations for future success, both scholastically and occupationally, than middle and upper-class families (Havighurst, 1976; Frideres, 1977). There is considerable research available to indicate that membership in the lower socioeconomic classes is associated with poor performance in the educational sphere (Rosen, 1956; Passow, 1963; Deosaran, 1978). Lower-class individuals also tend to be underrepresented in the higher levels of educational attainment, including college and graduate school and high school dropouts tend to be disproportionately from the lower classes (Jencks et al., 1973).

There has long been evidence that "higher" education is de-emphasized more in lower class homes than in middle and upper class families as low levels of parental achievement, motivation and ambition are thrust upon the child (Rosen, 1959; Gordon & Haywood, 1969). The

child reared in this low sociocultural environment has often had early attempts at exploration and curiosity hampered by parental punishment or negative reinforcement (Gray & Klaus, 1965; Schoggen & Schoggen, 1971). Such a child then has been conditioned for a global negative set of academic attitudes and ill-prepared for functioning in a society where middle class high language competence, curiosity and achievement motivation prevail. Tymchuk (1972) also asserts that such sociocultural variables have a direct negative effect on school attitudes, which in turn hinder optimal academic performance.

On the basis of a cross sectional study, Deutsch (1967) claimed that, compared with middle class children, lower social class children, both black and white, were subject to a cumulative deficit phenomenon between the first and fifth grade. He further indicated that this deficit was especially marked in the more abstract cognitive and language functions. Ausubel (1967) proposed that a child with an existing growth deficit resulting from deprivation of experience in the early years is less able to profit developmentally from new and more advanced levels of environmental stimulation as time goes on. Clarke and Clarke (1976) argue this view, however, suggesting a cumulative deficit will occur only when the child remains in a learning environment lacking sufficient intellectual stimulus and guidance. A more recent study by Cox (1983) indicated that culturally disadvantaged children show a cumulative deficit in certain aspects of scholastic development between the ages of 7 and 15 years. This deficit reflected mainly, but not exclusively, disadvantageous home background factors during the

child's pre-school years and continuing over the school years (Hess & Shipman, 1965).

Some studies have shown that the higher a student's social class background, the more likely is that student to complete the grade which normally leads to university (Clark, Cook & Fallis, 1975; Pavalko, 1967). Students whose parents are labourers, taxi-drivers, or unskilled tradesmen have a 50:50 chance of completing high school successfully and entering a post secondary institution, while students whose parents are professionals have a 9 out of 10 chance of enrolling (Deosaran & Wright, 1976). In other words, high social class students are more likely to enroll at university and enter professional occupations (Bancroft, 1964; Buttrick, 1972; Memorial Univ. on Career Decisions, 1974).

Canadian studies have consistently found that the higher the student's social class, the higher will be his/her expectations (Anisef, 1973; Porter & Blishen, 1973; Clark et al., 1975). Maykovich (1975) suggests that a student's self concept may be a crucial factor here regarding the shaping of their educational expectations. High social class students tend to have a higher academic self-concept than lower class students, so the higher SES people think more favorably about their ability to learn and thus are more successful in school grades.

The implications of low SES and academic self-concept may be crucial as Clark et al. (1975) suggested, in that teachers and counselors often direct students into programs which are linked to their social background. This situation, however, coupled with a student's low academic self-concept in the first place, increase the psychological

barriers confronting their academic success at the secondary level, possibly thwarting their goal of continuing higher education and career aspirations.

4. METHOD

4.1 Sample

In an attempt to explain the combined influences of several non-cognitive factors on academic performance, a sample was drawn comprising 373 students from 7 public high schools in Edmonton. A non-random sample was drawn from one school system only, the Edmonton Public School Board. This is advantageous in that student performance across systems may be subject to more variability due to different standards, philosophy and expectations. It is disadvantageous in that one might question that it is not truly representative of Alberta high school students and this factor might limit generalizations.

Grade 12 students comprised the sample for this study as they all had recently written grade 11 school examinations and were now completing their entire senior year, the criterion and the age factor were then held relatively consistent. This group was further sub-divided into female and male groups numbering 174 and 199 respectively.

4.2 Procedure

In this study, permission was first obtained from the Edmonton Public School Board and cooperation elicited from the principals and teachers of the respective schools in which the sample was drawn. Grade-point average here was defined as an average of students' recently written English 20 and Math 20 marks, abstracted from teacher graded examinations obtained from student records. These students represented varying socioeconomic levels with neither sex, nor race being a criteria

for selection, although an attempt was made to maintain relatively equal proportions between males and females.

The identified students were then informed that a university student was conducting some research and elicited their cooperation in participating. Consent forms were distributed to all subjects prior to testing, confirming those who wished to take part in the study. All students who were asked agreed to participate. The students were then requested to complete as a classroom group the Blishen Socioeconomic Index, the Survey of Study Habits and Attitudes, the School Attitude Measure, and lastly the Eysenck Personality Questionnaire. These inventories were completed on one occasion, as a previous pilot study of the instruments revealed the total testing time to be approximately 65 minutes, with little stress reported by the students. Instructions were designed to motivate students to respond seriously, to reassure them about student confidentiality, and to inform them how to complete the different tests.

The standard instructions were read to each classroom group and included the following:

> "I am a graduate student at the University of Alberta, and I am requesting your cooperation in participating in a research project being conducted at your school. You will be asked to complete written questionnaires in a group setting for the next hour or so. These tests are different from the usual variety in that there are no right or wrong answers, only your opinions and judgements are requested. The aim of this project is to sample your views on

various aspects of academic attitudes and feelings. It is important that you answer these questions honestly and not spend too long on any given question. Your responses will not be available to your teacher, or any other school personnel and they will in no way have anything to do with your present school marks. Any questions? O.K., let's look at the first questionnaire."

On completion of the questionnaires, the students were told that the examiner would return to the school at a later date, and make available to each participant, a brief summary of their results. The cooperating teacher and school principal were informed that the results of the study would be made known to them on a more global level in the near future, possibly during a staff meeting or professional development day.

4.3 Instruments

The measures in this study included the following:

(a) Personality. Four personality measures are tapped comprising Extraversion, Neuroticism, Psychoticism and a Lie scale (Eysenck Personality Questionnaire, 1975).

(b) Survey of Study Habits and Attitudes (Brown & Holtzman, 1967).

(c) School Attitude Measure (Dolan & Enos, 1980a).

(d) Blishen Socioeconomic Index (1967).

Eysenck Personality Questionnaire (Adult Form).

The E.P.Q. (Eysenck & Eysenck, 1975) was developed to measure three distinct and uncorrelated dimensions of personality: Extraversion-Introversion, Neuroticism and Psychoticism, and a lie scale

This yes-no format scale differs from previous Eysenck scales, in that a new scale, Psychoticism has been added.

The EPQ was designed to meet the needs of men and women of all ages and representing all social classes, except the very poor. The great majority of the standardization sample was urban. This scale contains 90 items, all keyed for "yes-no" responses of which 21 measure extraversion (E), 23 items measure neuroticism (N), 25 items measure psychoticism (P), and 21 constitute a lie scale (L). The EPQ manual presents means and standard deviations for six age groups ranging from 16 through 69, and for both sexes from a British population. Although norms have since been developed for North America, they are unfortunately based on a rather haphazard collection of mostly very small samples (Buros, 1978). According to the English norms, men have higher P and E scores than women and both sexes show a decline with age in each dimension. Conversely, women have higher N and L scores than men; both men and women decline in neuroticism with age, while both sexes show a rapid increase in L scores with advancing age. No formal instructions are included in the American edition of the EPQ regarding test administration and scoring.

Test re-test reliability over a one month interval ranges from .80 to .90 on the adult form for the E,N, and L scales, and is .71 and .83 for the P scale (Buros, 1978). Internal consistency reliability on the adult form given for males and females separately, ranges from .79 to .85 for the E, N, and L scales, and is .68 and .74 for the P scale.

Validity studies have found the E.P.Q. to significantly correlate with the Myers-Briggs Type Indicator on the Extraversion-Introversion scale (0.58), $p < .01$. The manual also indicates that validity findings about the previous Eysenck scales also apply to the E.P.Q. (Wakefield et al., 1976).

A description of the independent variables of this study now follows:

1. Extraversion. Eysenck and Eysenck (1975) described the typical extravert as being sociable, having many friends and liking parties. Extraverts are also aggressive, impulsive and somewhat unreliable. At the other end of this continuum is the typical introvert, who tends to be quiet, introspective and reflective.

2. Neuroticism (Emotionality). The typical highly neurotic person may be described as an anxious, worrying individual, moody and frequently depressed. Neurotics are very emotional, reacting very strongly to diverse stimuli, often leading to irrational and rigid behaviour. Low scores on this dimension, however, represent emotional stability reflected by an even tempered, controlled individual.

3. Psychoticism. This variable is still unclear, but Eysenck (1975) suggests that high scorers here are usually solitary, careless, uncaring, cruel, insensitive and toughminded. In spite of the clinical nature of the term, Eysenck's scales deal with normal behaviours, not pathological symptoms, which may only be applicable in extreme cases. Although Eysenck & Eysenck (1975) have clearly stated that the P scale measures only the predisposition to psychosis, Bishop (1977) has

suggested that this scale is not a good measure of a pre-disposition to psychosis and concludes that the P scale measures only some of the consequences of psychiatric disorder.

4. Lie Scale. Eysenck (1975) indicated that the function of a lie scale in a personality inventory is to measure intentional faking-good, caused by persons attempting to keep their test responses within the levels of social conformity. Social conformity and desirability can certainly interfere with truthful answers. However, other causes like a general erratic answering set can also contribute to response distortions, making lie score interpretation difficult.

Survey of Study Habits and Attitudes--Form H.

Brown & Holtzman (1967) indicate that the SSHA is a self-report multiple choice Likert type instrument used to measure study methods, motivation for studying and certain attitudes towards scholastic activities which are important in the classroom. It can be used as a screening or diagnostic instrument to select students who are having problems academically due to a negative school attitude or poor study habits, so that counseling can be initiated early and remediation expedited. As a teaching aid, the SSHA helps get across to students certain principles of effective study and motivational factors in academic success.

Both forms of the SSHA contain 100 items and have scores on four basic scales, two sub-totals and a total score. The following summary identifies each of these scales.

1. Delay Avoidance--DA. This scale refers to promptness in completing academic assignments, lack of procrastination and freedom from wasteful delay and distraction.

2. Work Methods--WM. This scale measures use of effective study procedures, efficiency in doing academic assignments and knowledge of how-to-study skills.

3. Teacher Approval--TA. This scale measures student's opinion of teachers and their classroom behaviour and methods.

4. Education Acceptance--EA. This scale taps a student's overall opinion of educational objectives, practices, and requirements.

5. Study Habits--SH. This scale combines the scores on the DA + WM scales to provide a measure of academic behaviour.

6. Study Attitudes--SA. This scale combines the scores on the TA + EA scales to provide a measure of scholastic beliefs.

7. Study Orientation--SO. This scale combines the scores on the SH + SA scales to provide an overall measure of study habits and attitudes.

Each of the forms of the SSHA is printed in a reusable booklet and responses are marked on a separate answer sheet for the IBM 805 test scoring machine. The same scoring keys and percentile norms are used for both males and females on form H, although separate norms are provided in the manual for grades 7-8-9 combined, and for grades 10-11-12 combined. According to the norms, women tend to have better study habits and attitudes than men, and so, have a general tendency to perform better in their schoolwork.

Validity data for form H (High-School Edition) has been completed in a large number of high schools in the United States. Low correlation coefficients (mean=.27) between SSHA and aptitude tests and between SSHA and school grades, (mean=.49), suggests that the test is related to grades, but is not just a measure of ability (Buros, 1978). Test-retest reliability coefficients on 237 ninth graders over a one month interval between sessions were .95, .93, .93, and .94 respectively for the DA, WM, TA, and EA scales, and .95 for SSHA total score designated SO. Buros (1978) indicates that although the SSHA is susceptible to faked scores, it has nonetheless demonstrated a suitable level of reliability and predictive relationship with grade-point-average to warrant its inclusion in research studies.

School Attitude Measure

Dolan and Enos (1980a) describe the SAM as a self-report likert type survey instrument developed to provide evaluation of students' affective responses to their school experience. It allows early identification of students with negative perceptions of their past schooling and who, therefore, are at risk for later school problems. This questionnaire can also be used for evaluating innovative school programs and enhancing student awareness of school outcomes. Through discussion with teachers and other school personnel, students can be made more aware of the importance of attitudes to success in school.

Three levels of the survey provide a continuous measurement for students in grades 4 through 12. They are level 4-6, level 7-8, and level 9-12, which contains 100 items and may be administered in

approximately 35 minutes. The attitude scales included in the SAM are as follows:

Scale 1--Motivation for Schooling. This scale is concerned with what the effect of the reactions of students to past school experiences has been, with how highly they value school and how much they want to pursue future schooling.

Scale 2--Academic Self-Concept-Performance Based. This scale reflects the confidence exhibited by students in their academic abilities and in their feelings about classroom performance.

Scale 3--Academic Self-Concept-Reference Based. This scale reflects how students perceive other individuals; like teachers and friends, feel about the students' school performance and ability to succeed academically.

Scale 4--Sense of Control over Performance. This scale reflects the feelings that students have about being able to exercise control over situations that affect them at school and to take responsibility for the outcomes of relevant school events.

Scale 5--Instructional Mastery. This scale addresses students' actual instructional skills, which include use of time, persistence, attention to task, ability to use and seek feedback and self-evaluation.

The development of the School Attitude Measure was based on the belief that the affective consequences of schooling are wide, varied and important. Further, these affective responses lead to the crucial perceptions that students form of themselves as learners. These self-perceptions can be as important for school success as intelligence

or academic preparedness. Such information about students can be valuable in making decisions about individual program development, planning and selection of students for special programs and vocational guidance.

Validity studies of 153 students in grades 5, 8 and 11, relative to the Comprehensive Assessment Program (Wick & Smith, 1980) of reading and math achievement, plus the Coopersmith (1967) self-esteem inventory revealed positive and significant correlations with the SAM sub-scales at the grade 11 level (range = .26 to .46). Validity data for the SAM based on teacher and parent ratings suggest that they rated students in a manner consistent with student self-reports; r=.19 to .61, (Dolan, 1983). The alpha reliability estimates for the total SAM score was .91 for grade 5, .94 for grade 8, and .95 for grade 11. The reliability figures increase over grade levels due to the increasing number of items per scale as one advances through different levels of this instrument. The SAM is more appropriate for the assessment of student group testing regarding school and self attitudes than for the rigorous interpretation of individual dynamics and behaviour (Dolan, 1983).

Blishen Socioeconomic Index of Occupations (1967). Social class is determined by this scale; social standing here is determined by a simple function of the distribution of education and income among incumbents for each of 320 occupations. Occupation here is considered to be the intervening activity linking income to education. So, by characterizing an occupation by the prevailing levels of education and income of its members, we are not only estimating its social and

economic status, but we are also describing one of its major causes and effects.

5. RESULTS AND DISCUSSION

5.1 Introduction

As previously stated, the main purpose of this study is to determine the independent contribution of non-intellectual variables to the prediction of high school academic achievement. To provide ease in following the presentation of the results, this chapter is composed of three major sections. The purpose of the first section is to provide descriptive statistics for the total sample as well as that for the female and male sub-samples. The purpose of the second section is to present the correlations obtained and is designed to examine the relationships between certain non-intellective factors and academic achievement for the total sample as hypothesized. Analysis is similarly conducted for males and females separately, however, sex differences were not hypothesized. The correlational component of the data analysis is highlighted by discussion of the findings relative to each hypothesis tested. Finally, the results of the regression analyses performed on the data are presented and analyzed. The purpose of this section is prediction, to predict the combined power of the twelve non-intellectual variables as well as to estimate which of these variables are most predictive of grade-point average for the total sample. This analysis is also conducted for the male and female sub-samples separately.

5.2 Summary of Descriptive Statistical Analysis

The descriptive statistics of the sample consists of two sections. The first section presents the means and standard deviations for the

total sample on each of the twelve criterion variables, as well as the dependent variable, academic achievement.

The second section, however, consists of a comparison of the descriptive statistics for females and males on the same variables of interest. Data are subjected to a t-test to establish whether the mean differences observed between males and females are statistically significant.

Finally, descriptive statistics from the Edmonton sample on each of the twelve non-intellectual variables and academic achievement are compared with descriptive statistics for the same variables from normative data of other research studies and test manuals. Table 1 summarizes the means and standard deviations for the total sample on each variable.

5.2.1 Academic Achievement

Table 1 reveals that the mean and standard deviation for the total Edmonton sample for academic achievement as measured by grade-point average is 66.75 and 9.56 respectively. Compared with the mean and standard deviation for the total sample, the mean grade-point average for females is 67.94 (S.D. = 9.89), $t=1.35$, $p>.05$, while that for males is 65.72 (S.D. = 9.18), $t=-1.24$, $p.>.05$. This finding indicates that the mean achievement score for females is greater than that reported for the total sample, while that for males is less than the total sample achievement mean. However, neither difference is statistically significant.

Table 1
Means and Standard Deviations for the Total Sample (N=373) on each of the 12 Criterion Measures and Grade Point Average

Measure	Mean	Standard Deviation
1. Grade Point Average	66.75	9.56
2. Socioeconomic Status	50.24	15.16
Student Habits and Study Attitudes		
3. Study Habits	45.18	15.76
4. Study Attitudes	52.32	15.36
Personality		
5. Psychoticism	3.02	2.49
6. Extraversion	14.64	4.72
7. Neuroticism	12.71	4.81
8. Lie Scale	7.72	4.08
School Attitudes		
9. School Motivation	59.25	8.84
10. Self-Concept, Performance	54.00	8.89
11. Self-Concept, Reference	53.53	7.92
12. Control Over Performance	64.06	6.96
13. Instructional Mastery	57.32	7.52

Table 2
Means, Standard Deviations, T-Values, and 2 Tail Probability for Males (N=199) and Females (N=174) on each of the 12 Criterion Variables and Grade Point Average.

	FEMALES					MALES				
	Mean	SD	T-Value	DF	2 Tail Prob.	Mean	SD	T-Value	DF	2 Tail Prob.
Measure										
GPA	67.94	9.89	2.25	371	.025*	65.72	9.18	——	——	——
SES	50.47	15.82	.27	371	.785	50.04	14.64	——	——	——
Study Habits & Study Attitudes										
SH	48.60	16.45	3.99	371	.000*	42.20	14.57	——	——	——
SA	54.36	15.64	2.42	371	.016*	50.53	14.96	——	——	——
Personality										
PSYCH.	2.41	2.26	-4.57	371	.000*	3.56	2.57	——	——	——
EXTR.	14.87	4.56	.89	371	.375	14.43	4.87	——	——	——
NEUR.	13.55	4.54	3.21	371	.001*	11.96	4.95	——	——	——
LIE	8.58	4.20	3.89	371	.000*	6.96	3.84	——	——	——
School Attitudes										
SHC.MOT.	60.19	9.44	1.92	371	.055*	58.43	8.25	——	——	——
S-C, P	54.32	9.66	.65	371	.518	53.72	8.20	——	——	——
S-C, R	53.72	8.52	.44	371	.660	53.36	7.39	——	——	——
C.O.Perf.	64.81	6.98	1.94	371	.053*	63.41	6.90	——	——	——
INS.MAS.	57.94	7.98	1.48	371	.139	56.78	7.09	——	——	——

* $p < .05$

Table 2 presents the means, standard deviations, and t-test comparisons between males and females for the twelve criterion variables and academic achievement. As can be seen from this table, the mean achievement score for high school females for the Edmonton sample is significantly above that found for males, 67.9 (S.D. = 9.89) compared to 65.7 (S.D. = 9.18), $t=2.25$, $p<.05$. This result tends to support research findings which suggest that girls are generally higher achievers than boys throughout their school years (Carter, 1952; Caslyn & Kenny, 1977; Lao, 1980). Females have also been found to be more sensitive to feedback regarding their performance on tests than males (McCandless, 1970). They are also more willing to take appropriate action to improve their academic standing by engaging in extended periods of study and taking advantage of additional academic assistance from teachers (Eagly & Whitehead, 1972). These results suggest that successful school performance plays a greater role in a girl's self-esteem, providing a major source of approval and praise for her, whereas boys tend to seek approval through athletics and other more socially stereotypic male behaviours (Primavera et al., 1974).

5.2.2 Study Habits and Study Attitudes

Table 1 shows that the mean and standard deviation for the total Edmonton sample for study habits is 45.18 (S.D. = 15.76), while the mean for study attitudes is found to be 52.32 (S.D. = 15.36). The mean study habits score for females is found to be significantly higher than that reported for the total sample, 48.60 (S.D. = 16.45) compared with 45.18 (S.D. = 15.76), $t = 2.34$, $p<.05$. Conversely, the mean study habits

score for males is found to be significantly below that reported for the total sample, 42.20 (S.D. = 14.57) compared to 45.18 (S.D. = 15.76), $t = -2.22$, $p<.05$.

Regarding study attitudes, the mean score for females is found to be greater than that reported for the total Edmonton sample mean as seen in Table 1, 54.36 (S.D. = 15.64) compared to 52.32 (S.D. = 15.36), $t = 1.44$, $p>.05$, although this difference is not statistically significant. The mean score for male study attitudes, however, is seen to be less than the observed mean for the total sample, 50.53 (S.D. = 14.96) compared to 52.32 (S.D. = 15.36), $t = -1.01$, $p>.05$, although, as with females, this difference is not statistically significant.

Table 2 reveals the results of the Survey of Study Habits and Attitudes for both sexes, indicating that high school females in Edmonton seem to have better study habits and study attitudes than males. Their respective mean scores for study habits are 48.6 (S.D. = 16.45) compared to 42.2 (S.D. = 14.57), $t=3.99$, $p<.05$ for males. Concerning study attitudes, the mean scores for females show 54.36 (S.D. = 15.64), compared with 50.53 (S.D. = 14.96), $t=2.42$, $p<.05$ for males. The differences observed here for this Edmonton sample are statistically significant and consistent with findings from previous studies. It is indicated that females show a greater interest in schooling and devote a more determined effort to earn higher grades as compared with males (DeVito, Tryon & Carlson, 1983). In the last decade, the increased involvement and interest in education by females seems to be resulting in better attitudes and study methods toward

scholastic activities than males (Brown & Holtzman, 1967). This point of view is supported by Borgstrom, Whiteley and Rudolph (1980), who suggest that improved female achievement may be due to the recent interest of females in pursuing various careers, especially those obtainable through academic studies at College. However, the greater performance of females over males may only be a reflection of the tendency of girls to respond to the testing situation in a more socially desirable manner than boys (Grams & Waetjen, 1975).

5.2.3 Personality

Psychoticism

With reference to Psychoticism, table 1 reveals that the mean for the total sample is 3.02 (S.D. = 2.49). Compared with the means and standard deviations for the total sample, the mean Psychoticism score for females is 2.41 (S.D. = 2.26) $t = -3.05$, $p<.05$, with corresponding scores for males being 3.56 (S.D. = 2.57), $t = 2.25$, $p<.05$. These results illustrate that the mean Psychoticism score for females in this Edmonton sample is lower than that found for the total sample, while that for males is higher than that found for the total sample. Both differences are statistically significant.

Table 2 reveals that the mean Psychoticism score for males is found to be significantly greater than that for females. Their respective scores are 3.56 (S.D. = 2.57) compared to 2.41 (S.D. = 2.26), with this difference being highly significant ($t = -4.57$, $p<.05$). These results are consistent with previous research findings indicating a tendency for males to attain higher Psychoticism scores than females (Bishop, 1977;

Eysenck & Eysenck, 1975). Persons scoring high on the psychoticism scale tend to describe themselves as careless, impulsive, inconsiderate, unfeeling and cruel. Accordingly, the overall interpretation is that males tend to profess more marked social alienation than females and that they see themselves as both a source and a target of malevolent action (Bishop, 1977). Dohrenwend and Dohrenwend (1976), however, warned that the Psychoticism scale on the Eysenck Personality Questionnaire (1975) does not really discriminate the mentally ill from the healthy. These authors further suggest that P-ness may be a more appropriate designation implying a leaning to anti-social actions. Eysenck and Eysenck (1975) agree with that interpretation and further suggest that high scorers on this scale are not typically pathological in nature, but may simply be predisposed to aggressive and troublesome behaviour. These authors further state that high scorers on the P-scale are generally referred to as being "tough-minded," as compared to "tender-minded," for those with scores at the low end of this continuum.

Extraversion

Table 1 shows that mean Extraversion score for the total Edmonton sample to be 14.64 (S.D. = 4.72). Compared to the total mean for Extraversion, the mean score for females is 14.87 (S.D. = 4.56), $t = .55$, $p > .05$. This difference is not statistically significant. Differences between the mean scores of males on the Extraversion measure are also found to be non-significant compared with that for the total sample, their respective means are 14.43 (S.D. = 4.87) compared to 14.64 (S.D. = 4.72), $t = -.51$, $p > .05$.

Table 2 shows that the differences between the extraversion scores for females and males are not statistically significant either, in that their respective means are 14.87 (S.D. = 4.56), compared to 14.43 (S.D. = 4.87), $t = .89$, $p>.05$. Previous research in this area has also found no significant differences between females and males on the Extraversion sub-test of Eysenck's Personality Questionnaires. Entwistle and Entwistle (1970) in a study with British College students found that the Extraversion mean for females coincided exactly with the Extraversion mean for males, 13.0 (Females) versus 13.0 (Males). A study by Anthony (1983) found the Extraversion mean for females to be 15.5 (S.D. = 3.2) compared to 15.3 (S.D. = 3.6) reported for males. These studies again show similar results for both sexes concerning this variable as found by other researchers.

Neuroticism

Table 1 indicates that the mean Neuroticism score for the total Edmonton sample is 12.71, with a standard deviation of 4.81. It can also be seen that the mean Neuroticism score for females is higher than that reported for the total sample, 13.55 (s.D. = 4.54) compared to 12.71 (S.D. = 4.81), $t = 1.95$, $p>.05$. This difference, however, is not statistically significant. The mean Neuroticism score for males is found to be lower than that found for the total sample, their respective means are 11.96 (S.D. = 4.95) compared for 12.71 (S.D. = 4.81), $t = -1.78$, $p>.05$. As found for females, this difference is not statistically significant.

According to Table 2, the mean Neuroticism score for females was found to be significantly greater than that reported for males, 13.55 (S.D. = 4.54) versus 11.96 (S.D. = 4.95), $t = 3.21$, $p<.05$. This finding is consistent with previous studies suggesting that females generally achieve higher scores on the Neuroticism scale of Eysenck's Personality Questionnaires (Entwistle & Welsh, 1969; Eysenck & Eysenck, 1975). These results may also be interpreted with reference to the alleged tendency of females to "worry" more than males, with strong emotional reactions, having the effect of impeding academic success (Frost, 1968). However, Bardwick's (1971) explanation as to why females tend to have higher neuroticism scores than males, is that girls are inclined to be more affiliative or socially conscious than boys. Their anxiety in school seems to arise from more social, rather than academic concerns.

Lie Scale

As seen in Table 1, the mean Lie Scale score for the total Edmonton sample is 7.72 (S.D. = 4.08). Compared with the mean and standard deviation for the total sample, the mean Lie Scale score for females is 8.58 (S.D. = 4.2), $t = 2.38$, $p<.05$. Similarly, the mean score for males is 6.96 (S.D. = 3.84), $t = -2.3$, $p<.05$. These findings indicate that the mean Lie Scale score for females is greater than that reported for the total sample, while that for males is less than that reported for the total sample. Both differences are statistically significant.

Table 2 reveals that the mean Lie Scale score for females is 8.58 (S.D. = 4.2), while that for males is 6.96 (S.D. = 3.84). This difference is statistically significant ($t = 3.89$, $p<.05$) in favour of

females over males, indicating that girls, in an effort to please, are more likely to "fake-good" their responses on the Eysenck Personality Questionnaire (Coh & Moore, 1978). Another possible interpretation of this finding is that females more clearly manifest a more heightened degree of social conformity or approval than males (Block, 1978). Buros (1978) suggests that females may be simply responding erratically to the items on this scale. Finally, as Stricker (1978) suggests, although the lie scale of the E.P.Q. is intended to assess dissimulation or feigning responses, it is more likely to be tapping social naivete. High scorers on this scale then may be projecting defensiveness, rather than a social desirability response style, a distinct though related factor.

5.2.4 School Attitudes

School Motivation

As revealed in Table 1, results of the School Motivation sub-test of the School Attitude Measure show the mean for the total sample to be 59.25, with a standard deviation of 8.84. The mean School Motivation score for females was found to be greater than that reported for the total sample, 60.19 (S.D. = 9.44), $t = 1.44$, $p>.05$, while that for males was found to be lower, 58.43 (S.D. = 8.25), $t = -1.09$, $p>.05$. Neither difference, however, is statistically significant.

With reference to Table 2, the School Motivation score for females is 60.19 (S.D. = 9.44) compared to 58.43 (S.D. = 8.25) for males. This difference is statistically significant ($t = 1.92$, $p<.05$) in favour of females over males, but is not consistent with previous research results, which tend to find that males typically score higher than

females on achievement motivation tests (Castenell, 1983; Feather & Simon, 1973). Other studies, however, have reported no such significant sex differences (Hofmann, 1974; Du Cette & Walk, 1972), and have even found males to have lower achievement motivation scores than females (Morgan & Mausner, 1973). Although males are expected to be task oriented and motivated to achieve, especially in the later grades, they do not always perform in accordance with these socially acquired expectations (Veroff, 1969). As social pressure to achieve is not as pressing for females, they may find school in general, to be a more pleasant experience than males. According to Connell and Johnson (1973), the role of females in society does not seem to be as rigidly defined. Consequently, girls tend to value schooling as a place to gain social acceptance and approval. School, then is not a place in which they compete with their peers for the highest academic standing or to gain personal autonomy as seems to be the case for males (Horner, 1968; Douvan, 1960).

Self-Concept-Performance Based

Table 1 reveals the mean and standard deviation for the total Edmonton sample for Self-concept-Performance Based is 54.0 and 8.89 respectively. Compared with the mean and standard deviation for the total sample, the mean Self-Concept-Performance Based score for females is 54.32 (S.D. = 9.66) $t = .38$, $p>.05$, while that for males is 53.72 (S.D. = 8.2), $t = -.37$, $p>.05$. These scores show that the mean score for females on Self-Concept-Performance Based is slightly above that reported for the total sample, while the mean score of males was less

than that found for the total sample. These differences are not statistically significant.

Regarding comparisons of the female and male means for self-concept, performance no significant differences are indicated, 54.32 (S.D. = 9.66) versus 53.72 (S.D. = 8.2), t = .65, p>,05, although the mean for females is found to be greater than that found for males.

Self-Concept-Reference Based

The mean and standard deviation presented in Table 1 for Self-Concept-Reference Based for the total sample is 53.53 and 7.92 respectively. Compared with the mean and standard for the total Edmonton sample, no statistically significant mean difference exists for females, 53.72 (S.D. = 8.52), t = .26, p>.05) or males, 53.36 (S.D. = 7.39), t = -.25, p>.05.

Table 2 reveals no significant statistical difference for Self-Concept-Reference Based scores between females and males in the Edmonton sample, although the mean for females is slightly greater than that reported for males. Their respective means are 53.72 (S.D. = 8.52) compared with 53.36 (s.D. = 7.39), t = .44, p>.05.

Control over Performance

Results of the Control over Performance sub-test of the School Attitude Measure shows the mean for the total sample to be 64.06, with a standard deviation of 6.96. Compared to the total sample mean for "Control over Performance", the mean score for females is 64.81 (S.D. = 6.98), t = 1.2, p>.05, while that for males is 63.41 (S.D. = 6.90), t = -1.08, p>.05. The mean score for females is found to be slightly

greater than the total sample mean, while that for males is found below this mean. These differences, however, are not statistically significant.

With reference to Table 2, the mean "Control over Performance" score for females is 64.81 (S.D. = 6.98), while that for males is 63.41 (S.D. = 6.90). The difference here is statistically significant ($t = 1.94$, $p<.05$) in favour of females. This subtest result tends to separate causal elements like school achievement into two dimensions, internality and externality. The higher scores of females tend to suggest that they feel in control of their fate. School marks and academic success for them are attributed to their own ability and effort (Buck & Austrin, 1971). The more external responses expressed by males in this Edmonton sample suggest that they perceive school success as being more a matter of task difficulty and luck factors that are beyond their control. Males, therefore, tend to exert less effort (Dweck & Goertz, 1978). A consistent finding in the research literature indicates that females tend to be more likely to attribute failure to poor ability than do males (Deaux, 1976). With reference to this same contention, Weiner (1974) suggests that those who believe success is attributable to ability, and failure to a lack of effort, are more likely to expect success in the future. This finding is encouraging for the adolescent females of this study.

Instructional Mastery

As seen in Table 1, the mean and standard deviation for the "Instructional Mastery" subtest of the School Attitude Measure for the

total Edmonton sample is 57.32 and 7.52 respectively. Compared to the total sample mean for "Instructional Mastery", the mean score for females is 57.94 (S.D. = 7.98), t = .66, p>.05, while that for males is 56.78 (S.D. = 7.09), t = -.84, p>.05. These comparisons reveal no statistically significant differences for either sex when compared to the total sample mean, although the pattern of females scoring above the total sample mean, with males scoring below this mean is continued.

Table 2 shows no significant statistical difference between the mean scores for each sex with reference to "Instructional Mastery" for the Edmonton sample, although the mean for females is found to be greater than that reported for males. Their respective scores are 57.94 (S.D. = 7.98) compared to 56.78 (S.D. = 7.09), t = 1.48, p>.05.

5.2.5 Socioeconomic Status

Table 1 reveals that the mean and standard deviation for socioeconomic status (SES) is 50.24 and 15.16 respectively. Compared to the total sample mean for "SES", the mean score for females is 50.47 (S.D. = 15.82), t = .16, p>.05, while that for males if 50.04 (S.D. = 14.64), t = -.16, p>.05. Differences found, however, are not statistically significant.

Table 2 indicates that there are no statistical mean differences between the males' and females' scores with regards to the socioeconomic status indices, with 50.47 (S.D. = 15.82) for females compared to 50.04 (S.D. = 14.64), t = .27, p>.05, for males. These results are not surprising in that all Edmonton schools involved in this study were from similar middle class social and economic conditions. Research findings

have shown that students with high achievement tend to come from families who are more urban, educated, and with higher status occupations (Featherman, 1972; Rosen & D'Andrade, 1959; Coleman, 1966). Boyle (1966), however, disagrees with this assumption and contends that such factors as the school's intellectual climate, able teachers, course variety and student effort are more adequate explanations of the variance in school achievement than social class.

5.3 Normative Data Comparisons

This section of the data analysis compares the descriptive statistics from the Edmonton sample on some selected variables with the standardization norms from the testmakers and with research findings reported in the research literature.

5.3.1 Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975)

Table 3 reveals that the mean Psychoticism score for females, for the Edmonton sample is 2.4 (S.D. = 2.3), while the standardization score (Eysenck & Eysenck, 1975) is 2.9 (S.D. = 2.6), $t = -.2{,}33$, $p<.05$. This indicates that the Psychoticism mean for Edmonton females is found to be significantly below that reported for the British norms of the Eysenck Personality Questionnaire. Similarly, the Psychoticism mean for Edmonton males, as seen in Table 3, is significantly below that found for the standardization sample, 3.6 (S.D. = 2.6) compared to 4.6 (S.D. = 3.3), $t = -3.87$, $p<.05$.

With reference to Extraversion, the normed standardization mean score for females is found to be less than that reported for the Edmonton sample as seen in Table 3, their respective means are 14.4

Table 3
Means, Standard Deviations, and T-Values for Edmonton sample Females (N=174) and Males (N=199) on Personality Variables compared with similar Standardization Statistics - Eysenck Personality Questionnaire Females (N=590) and Males (N=540)

		Edmonton Sample	E.P.Q. norms	D.F.	T-Value	Edmonton Sample	E.P.Q. norms	D.F.	T-Value
Psychoticism	Mean	2.4	2.9	762	-2.33*	3.6	4.6	737	-3.87*
	S.D.	2.3	2.6			2.6	3.3		
Extraversion	Mean	14.9	13.3	762	4.03*	14.4	14.4	737	—
	S.D.	4.6	4.6			4.9	4.3		
Neuroticism	Mean	13.5	13.2	762	.69	12.0	12.0	737	—
	S.D.	4.5	5.2			4.9	5.1		
Lie Scale	Mean	8.6	6.9	762	5.20*	7.0	6.0	737	3.18*
	S.D.	4.2	3.9			3.8	3.8		

* $p<.05$

(S.D. = 4.9) compared to 14.9 (S.D. = 4.6), $t = 4.03$, $p<.05$. Similar scores for males in this Edmonton sample coincided with the mean scores of the Eysenck Personality Questionnaire, 14.4 (S.D. = 4.9) versus 14.4 (S.D. = 4.3).

Regarding lie scale, the mean score for females for the Edmonton sample is found to be significantly above that reported for the standardization means as seen in Table 3, 8.6 (S.D. = 4.2) compared with 6.9 (S.D. = 3.9), $t = 5.20$, $p<.05$. The mean Edmonton sample lie scale score for males is also found to be significantly greater than that shown for the standardization norms as seen in Table 3, 7.0 (S.D. = 3.8) compared to 6.0 (S.D. = 3.8), $t = 3.18$, $p<.05$.

5.3.2 Survey of Study Habits and Attitudes

Table 4 presents the means, standard deviations and T-values of "study habits" and "study attitudes" for the total Edmonton sample, compared with similar standardization statistics.

As seen in Table 4, the mean score for study habits for the total Edmonton sample is 45.2 (S.D. = 15.8), while that for the standardization sample (Brown & Holtzman, 1967) is 43.9 (S.D. = 17.4), $t = 1.63$, $p>.05$. This suggests that Edmonton high school students achieve greater scores on "study habits" than American norms, although the mean difference is not statistically significant.

With reference to "study attitudes", Table 4 shows the mean score for the total Edmonton sample to be 52.3 (S.D. = 15.4), while the standardization mean is 56.4 (S.D. = 16.7), $t = -4.18$, $p<.05$. This indicates that high school students in Edmonton have significantly lower

Table 4
Means, Standard Deviations and T-Values for Total Edmonton Sample (N=373) on selected Criterion Measures, compared with similar Standardization Statistics - Survey of Study Habits and Attitudes (N=1469) and School Attitude Measure (N=385)

MEASURE		Edmonton Sample	Standardization norms	D.F.	T-Value
S.S.H.A.					
Study Habits	Mean	45.2	43.9	1841	1.63
	S.D.	15.8	17.4		
Study Attitudes	Mean	52.3	56.4	1841	-4.18*
	S.D.	15.4	16.7		
S.A.M.					
School Motivation	Mean	59.2	59.3	756	-0.15
	S.D.	8.8	10.1		
Self-Concept, Performance	Mean	56.0	54.3	756	-0.47
	S.D.	8.8	8.6		
Self-Concept, Reference	Mean	53.5	53.1	756	.67
	S.D.	7.9	8.3		
Control Over Performance	Mean	64.1	63.5	756	1.07
	S.D	7.0	8.4		
Instructional Mastery	Mean	57.3	57.9	756	-1.06
	S.D.	7.5	8.1		

* $p<.05$

"study attitude" scores than do those of the American standardization sample. This finding may be consistent with a gradual change reported in the study attitudes of contemporary high school students. Some examples of these reported changes (Winter et al., 1981) include decreased motivation of adolescent test-takers, less competitiveness, decreased discipline and less interest in school. Other examples include changes in curriculum and institutional policies, with a decline in emphasis placed on basic academic skills (Wharton, 1977). Finally, the rise of open classrooms and the increased popularity of independent study also contributed to lessened student motivation and involvement, including attention, concern, and effort that a student invests in school work (Laffey, 1982).

5.3.3 School Attitude Measure (Dolan & Enos, 1980)

Table 4 also presents the means, standard deviations and T-values of the sub-variables of the School Attitude Measure for the total Edmonton sample compared with similar standardization statistics. Table 4 indicates that the School Attitude means for the Edmonton sample are highly comparable to those of the standardized American norms. There were no statistically significant mean differences reported between these groups for any of the sub-variables.

5.4 Summary

In summary, descriptive statistics of the Edmonton sample support and are consistent with previous research and normative data for the 13 variables of interest, and are summarized as follows:

(1) Females' grade-point means are found to be significantly above those of males.

(2) Study habits and study attitudes means for females are found to be significantly greater than those reported for males. This implies that high-school girls in Edmonton spend more time on their studies and are more conscientious and dedicated to scholastic success.

(3) With regards to personality, the Neuroticism score for females is found to be significantly higher than that of males. This suggests that adolescent girls in Edmonton tend to be more anxious, or worry more than adolescent boys about things that might go wrong.

(4) With regards to the Lie Scale dimension, the mean score for females was found to be significantly greater than that of males. This suggests that high school girls in Edmonton are prone to act in a more socially desirable manner, or are more anxious and willing to please than males.

(5) With regards to Psychoticism, the scores for males are found to be significantly greater than those reported by females, denoting a greater propensity by Edmonton high school males to act in a more careless, unfeeling, socially alienated manner than females.

(6) With regards to School Motivation, the scores for females are found to be significantly greater than those of males, alluding to a greater desire by high school girls to feel more positive about their total school experience than males. Specifically, this applies to study behaviour, persistence and the desire to pursue further schooling.

(7) Finally, with regards to Control over Performance, the scores for females are found to be significantly greater than those of males. This denotes a greater confidence by high school females to exercise control over school situations than males. Further, this result suggests that Edmonton adolescent females are more amenable to take responsibility for the outcome of relevant school events such as grades, promotions, etc.

5.5 Correlation Analyses

Introduction

The major focus of this correlation analysis is to investigate the relationships between academic achievement, as defined by grade-point average (GPA) and personality, study habits, study attitudes, school attitudes and socioeconomic status (SES) variables. To facilitate ease in examining this data, results of the research hypotheses tested for each of the twelve sub-scales of the four measures used will be analyzed.

Product moment correlations are based on the scores from the total sample computed for GPA and each of the twelve predictor variables. The correlation coefficients obtained for the total sample are then used as the basis of the analysis of the relationships among grade-point average and each of the twelve predictor variables, as hypothesized. Similarly, the correlation coefficients computed for females and males separately, are used for further analysis of the data to enhance the correlation analysis, although these relationships are not hypothesized.

Another facet in the correlation analysis consists of the computation of Coefficients of Determination (r^2), based on the computed

correlation coefficients. This step provides an estimate of the shared variation between GPA and each of the twelve predictor variables. This analysis is intended to provide further enhancement of the data analysis, and the higher the value of this coefficient (r^2), the greater the proportion of shared variation between GPA and each of the twelve hypothesized variables. It should be noted that because of the large number of students sampled, correlation coefficients tend to be rather small, but statistically significant. Hence, little practical or psychological importance is attributed to the low, but significant coefficients observed in the intercorrelation matrices (Tables 5,6,7 and 8). As stated earlier, statistical significance in this study implies a probability level of .05 and less.

For the purpose of ease in following the data analysis, each of the hypotheses are restated and discussed. Table 5 highlights the main focus of this analysis, presenting the correlation matrix of GPA with each of the twelve affective predictors for the total sample.

5.5.1 Correlation Analyses of Personality Dimensions

Hypothesis 1

Extraversion will be inversely related to academic performance, that is, subjects with high extraversion scores will have lower academic achievement than those who attain lower scores.

Table 5, which gives the product moment correlations between grade-point average and the predictor variables, indicates that hypothesis 1 is not confirmed, in that the correlation between Extraversion and GPA ($r = -0.07$) failed to reach significance ($p>.05$).

Table 5
Correlation Coefficients Between Non-Intellective Factors and Grade-Point Average for Total Sample (N=373)

	1. GPA
1.	
2. Socioeconomic Status	0.09
3. Study Habits	0.29*
4. Study Attitudes	0.18*
5. Psychoticism	-0.13*
6. Extraversion	-0.07
7. Neuroticism	-0.01
8. Lie Scale	-0.04
9. School Motivation	0.17*
10. Self-Concept, Performance	0.40*
11. Self-Concept, Reference	0.44*
12. Control over Performance	0.15*
13. Instructional Mastery	0.27*

* $p<.05$

Although the magnitude of this relation failed to reach significance, the direction of the relationship is as predicted. According to this finding Extraversion does not seem to be a significant factor relating to the academic performance of the sample of Edmonton high school students.

Hypothesis 2

Neuroticism will be positively related to academic performance, that is, subjects with high neuroticism scores will have higher academic achievement than those who attain lower scores.

This hypothesis is not confirmed with reference to both the magnitude and the direction of the relationship predicted as seen in Table 5, ($r = -0.01$, $p > .05$). Thus, neuroticism may not be a factor directly influencing the school achievement of the Edmonton high school sample.

It should be noted, however, that other research findings concerning the relation between neuroticism and academic achievement are consistent with the low inverse relationship found in this study. Orpen (1976), in a study with adolescents, reported a negative, non-significant relationship ($r = -0.20$, $p > .05$), while Eysenck and Cookson (1969) in a study involving grade 6 students, found a low, but significant negative relationship between neuroticism and academic achievement, ($r = -0.10$, $p < .05$). These findings serve to highlight the consistency of research findings for the relation between neuroticism and grade-point average.

Hypothesis 3

Psychoticism will be inversely related to academic performance, that is, subjects with high psychoticism scores will have lower academic achievement than those who attain lower scores.

Table 5 reveals that this hypothesis is confirmed with respect to both the magnitude and direction of the relation predicted for the total sample ($r = -0.13$, $p<.05$). However, although the correlation is statistically significant, the magnitude of the relationship is negligible and of little psychological or practical meaning. These results seem to indicate that Psychoticism is a minor factor influencing grade point average in the Edmonton sample since the two variables have only 2% of their variance in common.

The direction of these results are in accord with the findings of Goh & Moore (1978), who found a low negative relation between psychoticism and academic achievement ($r = -0.08$, $p>.05$). However, there is a dearth of recent findings concerning the relation of psychoticism to academic achievement. From that point of view, therefore, the results of this study make a significant contribution to new knowledge about the relationship between psychoticism and academic performance in a non-pathological sample of students. The negative correlation in this study suggests a possible impeding effect of psychoticism on high school achievement. Eysenck and Eysenck (1975) state that in spite of the psychiatric nature of the term used here and its resemblance to other pathological concepts, the emphasis is on normal, not deviant symptoms.

Table 6
Intercorrelations Among Non-Intellectual Variables and Achievement for Total Sample (N=373)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. GPA	——	0.09	0.29*	0.18*	-0.13*	-0.07	-0.01	-0.04	0.17*	0.40*	0.44*	0.15*	0.27*
2. SES	0.09	——	0.01	0.08	-0.06	0.01	-0.11*	-0.15*	0.10*	0.10	0.15*	0.09	0.04
3. SH	0.29*	0.01	——	0.69*	-0.36*	0.04	-0.33*	0.35*	0.55*	0.67*	0.49*	0.63*	0.76*
4. SA	0.18*	0.08	0.69*	——	-0.43*	0.02	-0.30*	0.24*	0.66*	0.55*	0.42*	0.73*	0.65*
5. PSYCH.	-0.13*	-0.06	-0.36*	-0.43*	——	-0.02	0.15*	-0.25*	-0.41*	-0.27*	-0.20*	-0.40*	-0.35*
6. EXTR.	-0.07	0.01	0.04	0.02	-0.02	——	-0.12*	-0.11*	0.13*	0.21*	0.18*	0.05	0.12*
7. NEUR.	-0.01	-0.11*	-0.33*	-0.30*	0.15*	-0.12*	——	-0.20*	-0.21*	-0.35*	-0.30*	-0.38*	-0.30*
8. LIE	-0.04	-0.15*	0.35*	0.24*	-0.25*	-0.11*	-0.20*	——	0.19*	0.15*	0.05	0.24*	0.26*
9. SCH.MOT.	0.17*	0.10*	0.55*	0.66*	-0.41*	0.13*	-0.21*	0.19*	——	0.52*	0.39*	0.60*	0.66*
10. S-C, P	0.40*	0.10	0.67*	0.55*	-0.27*	0.21*	-0.35*	0.15*	0.52*	——	0.77*	0.57*	0.72*
11. S-C, R	0.44*	0.15*	0.49*	0.42*	-0.20*	0.18*	-0.30*	0.05	0.39*	0.77*	——	0.54*	0.58*
12. C.O.PERF.	0.15*	0.09	0.63*	0.73*	-0.40*	0.05	-0.38*	0.24*	0.60*	0.57*	0.54*	——	0.69*
13. INS.MAS.	0.27*	0.04	0.76*	0.65*	-0.35*	0.12*	-0.30*	0.26*	0.66*	0.72*	0.58*	0.69*	——

* $p<.05$

Table 6 contains the intercorrelations for all non-intellective predictors and GPA for the total sample. Because the independence of the personality dimensions is central to Eysenck's theory, the intercorrelations of the Eysenck scales: Psychoticism, Extraversion, Neuroticism and Lie Scale are computed to examine the relationships among them. As can be seen in Table 6, while many of the correlations are significant statistically, they are quite low. The highest relationship is seen between Psychoticism and Lie Scale ($R = -0.25$, $p<.05$), while the lowest correlation is found between Psychoticism and Extraversion ($r = -0.02$, $p>.05$). Complete independence of these factors is not achieved, however, as they clearly depart slightly from orthogonality. These discrepancies, however, are not significant from an applied point of view, but should be noted.

5.5.2 Correlation Analyses of School Attitude Sub-Scales

Hypothesis 4

School Motivation will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic achievement than those with lower scores.

Table 5, which reveals the product moment correlation between GPA and "school motivation" indicates that hypothesis 4 is confirmed in that the results are statistically significant ($r = 0.17$, $p<.05$). However, this finding is not of major practical importance as "school motivation" and GPA share only 3% of their variance in common for this Edmonton sample.

The low, but significant magnitude of the relation as well as the positive direction found between school motivation and GPA seem consistent with results of research studies which reported negligible to low correlations ranging from $r = 0.20$ to .31, $p<.05$ (Boyle, 1983; Schibeci, 1984), for these variables.

With reference to the Edmonton sample, these results tend to indicate that high school students who regard schooling as being worthwhile as a means to a successful career and an avenue of personal satisfaction, are inclined to be more successful academic achievers. According to Lefcourt (1976), positive motives are catalysts which impel students to take action, and such motives have drive producing qualities. Freedom to solve academic problems and to explore and develop personal interests tend to improve intellectual independence, self-worth and self-actualization (Kasambira, 1984). In turn, self-actualization leads to further motivation by students to search for additional solutions to problems, enticing students to pursue further schooling (Ringness, 1967).

Hypothesis 5

Self-Concept-Performance Based will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic performance than those with lower scores.

Results of the correlational analyses found in Table 5 indicate that the hypothesized relation between GPA and Self-Concept-Performance Based has been confirmed both with respect to direction and magnitude (r

= 0.40, $p<.05$). This low to moderate correlation result may be interpreted as indicating that Self-Concept-Performance Based is an important factor influencing the academic performance of the Edmonton high school population since the two variables share 16% of their variance in common ($r^2 = 0.16$). These results have practical significance in that academic Self-Concept-Performance Based, reflects the confidence exhibited by Edmonton high school students in their own academic abilities.

Similar results have been reported by Diesterhaft and Gerken (1983) and Larned and Muller (1979) who found correlations of $r = 0.36$, $p<.001$ and $r = 0.45$, $p<.05$ respectively between GPA and Self-Concept-Performance Based among junior high school students.

The findings of these and the current investigation suggest that students tend to achieve optimally when they feel competent about their ability to complete the majority of school tasks successfully, and so perform classroom tests and assignments adequately. With reference to Self-Concept, Performance based, Lipton (1963) suggests that to know and to value oneself contributes significantly to the development of an able, curious, and mature learner. Similarily, Gillman (1969) pointed out that the development of a positive self-concept, based on performance, is a necessary prerequisite to academic achievement and should be a major focus of all schools concerned with the development of productive students.

Hypothesis 6

Self-Concept-Reference Based will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic performance than those with lower scores.

As seen in Table 5, this hypothesis is confirmed with respect to both the magnitude and the direction of the relation predicted for the total sample ($r = 0.44$, $p<.05$).

The finding of a significant relationship between Self-Concept-Reference Based and GPA is not surprising and is consistent with the relationship found for Self-Concept-Performance Based, which is highly correlated with it.

For Edmonton high school seniors, these results can be interpreted as indicating that perceptions of how significant others feel about their ability to succeed academically, have significant effects on their GPA. The important sources of such perception of ability and academic proficiency tend to be teachers generally, and peers and parents specifically.

Compared with other correlations found in this study, the relation between Self-Concept-Reference Based and GPA is the strongest relationship with 19% ($r^2 = 0.19$) of their variance in common, compared with Self-Concept-Performance Based, sharing only 16% of the variance with GPA. In general, the two self-concept measures account for an important proportion of the variance with GPA and underscore the importance of self-concept as a major factor influencing academic performance in the Edmonton sample.

It appears from these results, that this Edmonton sample perceives reinforcement and positive reactions from the immediate social environment as a catalyst for achieving and maintaining high academic performance, particularly those from teachers and peers. The relationship of academic self-concept, reference based and achievement found in this study ($r = 0.44$) is similar to Jordon's (1981) finding of $r = 0.45$, $p<.05$, and Morse's (1963) findings of $r = 0.43$, $p<.05$, between the same variables in junior high school samples.

The finding of a positive relationship between self-concept, reference based and GPA may further be interpreted with reference to self-concept in general. It seems that students who have a positive estimation of their ability to learn and more importantly feel that significant others expect them to do well in school, are more motivated to achieve, and so earn the highest grades (Marsh, Parker & Smith, 1983). Purkey (1970) stresses the importance of academic self-concept throughout one's schooling and suggests that a continuous interaction takes place between the perceived self and academic achievement, and that each directly influences the other.

Hypothesis 7

Control over Performance will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic performance than those with lower scores.

Results of the correlation analysis found in Table 5 show that the hypothesized relation between GPA and Control Over Performance has been confirmed both with respect to magnitude and direction and that the

results are significant ($r = 0.15$, $p<.05$). This negligible correlation, however, has very little psychological or practical importance, as GPA and Control over Performance share only 2% ($r^2 = 0.02$) of their variance in common. These results, do however, suggest that awareness and willingness to take responsibility for school outcomes have relevance as a factor affecting the academic achievement of Edmonton high school students.

The low, but significant magnitude of the relation, as well as the positive direction found between GPA and Control over Performance is in line with a study by Diesterhaft and Gerken (1983), who also found similar, low, but significant correlations between locus of control and academic achievement in an urban adolescent sample ($r = 0.23$, $p<.05$). However, the relationship reported by Douglas and Powers (1982) was stronger for these variables ($r = 0.35$, $p<.05$).

These results suggest that the ability of students to exercise control over situations that affect them such as grades or promotion, are minor ingredients of academic success. Those students, however, who do not see a causal relationship between their efforts and achievement are even less motivated to engage in academic activities and therefore tend to exhibit less of the type of behaviour necessary for school success (Wolk & Du Cette, 1974). This type of student is more likely to attribute poor academic performance to bad luck, or fate, by projecting more dependence on external agents and less on personal initiative and self-regulation (Sherman & Hofmann, 1980).

Hypothesis 8

Instructional Mastery will be positively related to academic performance, that is, subjects with high scores on this sub-test will have higher academic performance than those with lower scores.

Table 5 reveals that this hypothesis is confirmed with respect to both the magnitude and the direction of the predicted relation for the total sample ($r = 0.27$, $p<.05$). The low magnitude of this statistically significant correlation, however, implies limited psychological or practical significance. Instructional Mastery thus, seems to exert a moderate influence on GPA for the Edmonton sample, since these variables only share 7% of their variance in common.

Further interpretation of these results suggest that for these high school students, organizational skills such as orderly class notes, persistence in instructional tasks, or focused attention on instructional material, are significant determinants of school success. Research findings on the relation between GPA and Instructional Mastery are in general agreement with the findings of this study. Cattell and Kline (1977) reported low, but significant associations between these variables ($r = 0.20$, $p<.05$) for a university sample.

According to Burgess (1956), confidence about instructional skills increases one's incentive to acquire consistent study times, to attend classes regularly and be more cognizant of material taught. Gerhart (1958), in agreement with Burgess, sums up the position by proposing that students who have command of their instructional material tend to show a greater drive and persistence to organize and complete academic

tasks. He further suggests that underachievers are less able to adapt to new and difficult material than their achieving counterparts. They seem to lack the basic knowledge of independent and efficient study techniques.

Table 6, pertaining to the intercorrelation matrix for the total sample for all affective variables and GPA, shows the correlation of the five basic S.A.M. subscales: School Motivation, Self-Concept-Performance Based; Self-Concept-Reference Based; Control over Performance and Instructional Mastery with each other. As expected, subscale intercorrelations reveal low to medium high values as this measure generally taps several related dimensions of student attitude expression. Table 6 shows that the highest correlation among sub-scales is found between Self-Concept, Performance based and Self-Concept, Reference based ($r = 0.77$, $p<.05$), while the lowest correlation is found between School Motivation and Self-Concept-Reference Based, ($r = 0.39$, $p<.05$).

5.5.3 Correlation Analyses of Study Behaviour

Hypothesis 9

School study habits and study attitudes will be both positively related to academic performance, that is, subjects with high scores on these scales will have higher academic performance than those with lower scores.

Results of the correlation analysis revealed in Table 5 indicate that this hypothesis is confirmed for study habits with respect to both magnitude and direction ($R = 0.29$, $p<.05$). This low correlation result may be interpreted as indicating that study habits exert a moderate

influence on the academic achievement of Edmonton high school students, as the two variables only share 8% of their variance in common.

Research findings on the relation between study habits and grade-point average are in general agreement with the findings of this study. For example Keith (1982) found a significant relationship between study habits and GPA ($r = 0.32$, $p<.05$), for high school students, while Rutkowski and Domino (1975) found a lower association for these variables ($r = 0.23$, $p<.05$) in a college sample. It seems therefore seems that effective study habits involving promptness in completing assignments, freedom from distraction, and effective study procedures are advantageous for optimal academic performance.

With reference to study attitudes, the magnitude and direction of the hypothesized relation with grade-point average is confirmed ($r = 0.18$, $p<.05$), sharing 3% of their variance in common. Although statistically significant, this negligible correlation suggests that the scholastic success of Edmonton high school students is little influenced by their concern or approval by teachers, teaching methods, or educational objectives.

Similar results have been reported by Laffey (1982), who found a correlation of $r = 0.23$, $p<.05$ between study attitudes and achievement for an adolescent sample. The relevance of the connection between study attitudes and academic achievement has been reported by DeVito, Tryon, and Carlson (1983), although, as predicted in this study, it is self-evident that organization of class material and concentrated time and effort spent on homework tend to enhance grades. With regards to study behaviour, Carrol (1963) pointed out that habits of attention,

concentration and time-spent on school material can augment school grades. It seems apparent that few educational benefits are possible unless instructional activities can elicit and maintain student interest and involvement (Kohr, 1975).

With reference to the correlation of study habits and study attitudes with each other, Table 6 indicates a moderate association between these variables ($r = 0.69$, $p<.05$) as expected, since both variables are providing measures of personal traits that are relevant to academic success.

5.5.4 Socioeconomic Status

Hypothesis 10

Socioeconomic status will be positively related to academic performance, that is, subjects with high socioeconomic indices will have higher academic performance than those with lower indices.

As seen in Table 5, this hypothesis is not confirmed in that the correlation between SES and GPA ($r = 0.09$) failed to reach significance ($p>.05$). It is seen however, that although the magnitude of this relation failed to reach significance, the direction of the relationship is as predicted. For the Edmonton sample, social class does not seem to be a factor influencing high school academic achievement.

Research on socioeconomic status and academic achievement has generally revealed low, positive correlations. For example, Rosen and Aneshensel (1978) found a low, but significant association ($r = 0.18$, $p<.001$) between social class and GPA with a large sample of American adolescents from grades 7 to 12. Lueptow (1975) also found a similar

relationship for these variables ($r = 0.16$, $p<.05$) for a grade 12 population, in keeping with the small relationship reported in this study.

For the Edmonton sample, SES is found to be significantly related to only one variable, Lie Scale ($R = -0.18$, $p<.05$), suggesting that higher social class grade 12 students tend to be more realistic about self-perceptions and less likely to conform to social conventions and nuances.

5.6 Correlation Analyses, Females-Males Comparison

To enhance data analysis, correlation analyses are applied to the test results for each of the variables for females and males separately. In so doing, it becomes possible to compare females and males. Correlation matrices for all criterion measures and GPA for females and males are presented in Tables 7 and 8 respectively.

5.6.1 Personality

With regards to female-male comparisons on each of the personality variables, the intercorrelation matrix on Table 7 for females and Table 8 for males shows no significant associations for either sex between the personality dimensions and GPA. Whereas the relationship between Psychoticism and GPA for females is $r = -0.07$, $p>.05$, that for males is $r = -0.14$, $p>.05$. Similarly, the relationship between Extraversion and GPA for females is $r = -0.03$, $p>.05$, while that for males is $r = -0.11$, $p>.05$. The relationship between Neuroticism and GPA for females is $r = -0.08$, $p>.05$, compared with $r = 0.01$, $p>.05$ for males.

Table 7
Intercorrelations Among Non-Intellectual Variables and Achievement for Females (N=174)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. GPA	—	0.17*	0.35*	0.19*	-0.07	-0.03	-0.08	-0.05	0.19*	0.49*	0.52*	0.25*	0.34*
2. SES	0.17*	—	0.15	0.13	-0.03	0.01	-0.14	-0.14	0.20*	0.25*	0.29*	0.15	0.18*
3. SH	0.35*	0.15	—	0.72*	-0.38*	0.11	-0.35*	0.32*	0.59*	0.69*	0.52*	0.68*	0.79*
4. SA	0.19*	0.13	0.72*	—	-0.46*	0.20*	-0.34*	0.26*	0.72*	0.58*	0.43*	0.73*	0.67*
5. PSYCH.	-0.07	-0.03	-0.38*	-0.46*	—	0.02	0.13	-0.29*	-0.49*	-0.30*	-0.26*	-0.51*	-0.40*
6. EXTR.	-0.03	0.01	0.11	0.20*	0.02	—	-0.18*	-0.10	0.22*	0.27*	0.23*	0.09	0.20*
7. NEUR.	-0.08	-0.14	-0.35*	-0.34*	0.13	-0.18*	—	-0.33*	-0.28*	-0.35*	-0.34*	-0.39*	-0.28*
8. LIE	-0.05	-0.14	0.32*	0.26*	-0.29*	-0.10	-0.33*	—	0.24*	0.15*	0.06	0.28*	0.28*
9. SCH.MOT.	0.19*	0.20*	0.59*	0.72*	-0.49*	0.22*	-0.28*	0.24*	—	0.52*	0.37*	0.68*	0.63*
10. S-C, P	0.49*	0.25*	0.69*	0.58*	-0.30*	0.27*	-0.35*	0.15*	0.52*	—	0.79*	0.60*	0.73*
11. S-C, R	0.52*	0.29*	0.52*	0.43*	-0.26*	0.23*	-0.34*	0.06	0.37*	0.79*	—	0.56*	0.59*
12. C.O.PERF.	0.25*	0.15	0.68*	0.73*	-0.51*	0.09	-0.39*	0.28*	0.68*	0.60*	0.56*	—	0.71*
13. INS.MAS.	0.34*	0.18*	0.79*	0.67*	-0.40*	0.20*	-0.28*	0.28*	0.63*	0.73*	0.59*	0.71*	—

* $p<.05$

Table 8
Intercorrelations Among Non-Intellectual Variables and Achievement for Males (N=199)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. GPA	—	0.01	0.19*	0.15*	-0.14	-0.11	0.01	-0.08	0.12	0.31*	0.36*	0.05	0.19*
2. SES	0.01	—	-0.13	0.02	-0.09	0.00	-0.09	-0.18*	-0.01	-0.07	0.01	0.02	-0.10
3. SH	0.19*	-0.13	—	0.64*	-0.29*	-0.03	-0.39*	0.33*	0.50*	0.65*	0.46*	0.58*	0.74*
4. SA	0.15*	0.02	0.64*	—	-0.37*	-0.14*	-0.31*	0.17*	0.59*	0.52*	0.42*	0.71*	0.63*
5. PSYCH.	-0.14	-0.09	-0.29*	-0.37*	—	-0.03	0.23*	-0.16*	-0.33*	-0.24*	-0.16*	-0.31*	-0.30*
6. EXTR.	-0.11	0.00	-0.03	-0.14*	-0.03	—	-0.10	-0.14	0.03	0.16*	0.13	0.00	0.04
7. NEUR.	0.01	-0.09	-0.39*	-0.31*	0.23*	-0.10	—	-0.17*	-0.20*	-0.37*	-0.28*	-0.41*	-0.36*
8. LIE	-0.08	-0.18*	0.33*	0.17*	-0.16*	-0.14	-0.17*	—	0.10	0.13	0.04	0.18*	0.22*
9. SCH.MOT.	0.12	-0.01	0.50*	0.59*	-0.33*	0.03	-0.20*	0.10	—	0.51*	0.42*	0.52*	0.70*
10. S-C, P	0.31*	-0.07	0.65*	0.52*	-0.24*	0.16*	-0.37*	0.13	0.51*	—	0.74*	0.53*	0.70*
11. S-C, R	0.36*	0.01	0.46*	0.42*	-0.16*	0.13	-0.28*	0.04	0.42*	0.74*	—	0.53*	0.57*
12. C.O.PERF.	0.05	0.02	0.58*	0.71*	-0.31*	0.00	-0.41*	0.18*	0.52*	0.53*	0.53*	—	0.66*
13. INS.MAS.	0.19*	-0.10	0.74*	0.63*	-0.30*	0.04	-0.36*	0.22*	0.70*	0.70*	0.57*	0.66*	—

* $p<.05$

Finally, the relationship between Lie Scale and GPA for females is ($r = -0.05$, $p>.05$), compared with ($r = -0.08$, $p>.05$) for males.

Hence, for both males and females of the Edmonton sample, "personality" is not significantly related to academic achievement. These results are consistent with those of Entwistle and Entwistle (1970) who also found low and insignificant relationships for college females between Extraversion and GPA ($r = -0.14$, $p>.05$) and Neuroticism and GPA ($r = 0.04$, $p>.05$). For males, they obtained correlations of $r = -0.01$, $p>.05$, and $r = -0.07$, $p>.05$, for the same variables. The findings of Goh and Moore (1978) also indicated low correlations for both males and females between Psychoticism and achievement ($r = 0.08$, $p>.05$), and these results are consistent with the insignificant findings reported in the present study.

5.6.2 School Attitudes

School Motivation

With regards to the relationship of School Motivation to academic achievement, results of the correlation analysis found in Table 7 reveal, as was found for the total sample, a positive and significant relationship for females ($r = 0.19$, $p<.05$). However, unlike that found for the total sample, Table 8 reveals the results are not significant for males. ($r = 0.12$, $p>.05$)

According to these findings, there is a stronger relationship between school motivation and achievement for females than that found for males. Horner (1978) suggests that one justification for the higher school motivation scores of females is that the attitudes of women are

undergoing a change as they seem no longer influenced by the motive to "avoid success" and to avoid direct competition and confrontations with males. Horner's point of view has also been supported by Rosen and Aneshensel (1978) who explained that in the past, the message that parents and society relay to females has been somewhat contradictory: achievement is fine, but it must not interfere with marriage and raising a family. The results in this study, however, reveal that Edmonton females appear to have greater academic aspirations than males, suggesting a shift in the traditional female submissive role concerning future academic or career strivings (Burns, 1977).

Academic Self-Concept

With reference to Self-Concept-Performance Based and Self-Concept-Reference Based, Table 7 indicates, as found for the total sample, positive and significant correlations with academic achievement for females. Their respective coefficients are: ($r = 0.49$, $p<.05$) and ($r = 0.52$, $p<.05$). Similarly, for males, Table 8 reveals, as found for the total sample, positive and significant correlations with academic achievement. Their respective coefficients are: ($r = 0.31$, $p<.05$) and ($r = 0.36$, $p<.05$).

Thus, for both males and females of the Edmonton sample, self-concept is a significant factor relating to grade-point average and these findings are consistent with results found for the total sample.

These results are also consistent with those of Jordan (1981), who found positive and significant relationships between self-concept and GPA for both females ($r = 0.45$, $p<.05$) and males ($r = 0.41$, $p <.05$) in a junior high school sample.

Control over Performance

With regards to the relationship between Control over Performance with GPA, results for the correlation matrix for females in Table 7 are similar to that of the total sample, positive and significant ($r = 0.25$, $p<.05$). For males, however, Table 8 shows an insignificant relationship between Control over Performance and GPA ($r = 0.05$, $p>.05$), unlike that found for females or for the total sample.

These findings depict Control Over Performance to be more closely related to academic achievement for females than for males. Fanelli (1977) suggests that females assume more responsibility for their actions and the consequences of such actions at school, than do males. Similarly, de Charms (1976), with reference to school achievement, claims that women tend to be more self-motivated, work more independently and be more goal-directed than men, especially with reference to possible career ramifications. These results are in line with those of Prawat (1976), who also found higher relationships between locus of control and GPA for females ($R = .30$, $p<.01$) than for males, ($r = -.01$, $p>.05$).

5.6.3 Study Behaviour

With reference to the relationship of Study Habits to GPA, results of the correlation analysis in Table 7 reveals for females, positive and significant relationships ($r = .35$, $p<.05$), similar to that found for the total sample. Table 8 shows the relation between Study Habits and GPA for males is also similar to that found for the total sample, a positive and significant ($r = .19$, $p<.05$) relationship.

Consequently, for the Edmonton sample, these results suggest that good study habits are moderate factors influencing school success for both male and female high school students, although for females, 12% of the variance of GPA in shared with study habits, while for males only 4% of this common variance is shared for these same variables.

Support for these findings is revealed in a study by Khan (1969), who also found the study habits of females ($r = .20$, $p<.01$) to be more closely related with achievement than males ($r = .12$, $p<.05$) in a junior high school sample.

These findings seem to suggest that although both males and females need consistent and efficient study techniques to achieve optimally, females perceive a closer causal connection than males between good marks and good study habits (Fredrick & Walberg, 1980).

5.6.4 Socioeconomic Status

Finally, with reference to the relationship of SES to GPA, results of the correlation matrix found in Table 7 reveal that the relationship between social class and achievement for females to be positive and significant ($r = .17$, $p<.05$), unlike the nonsignificant findings reported for the total sample. Results of the correlation analysis found in Table 8, for males, however, is similar to that found for the total sample which was positive, but not significant ($r = .01$, $p>.05$).

With reference to the Edmonton sample, these results suggest that social class is a more important factor influencing academic achievement in females than in males. It is to be expected, however, as academic success becomes more highly valued for women, sex differences in

academic or occupational goals will tend to dissipate (Marini & Greenberger, 1978; Berman & Haug, 1975).

Research involving SES and academic achievement has yielded conflicting results concerning sex differences. Marini and Greenberger (1978) found similar correlations of ($r = .22$, $p<.01$) for females and ($r = .31$, $p<.01$) for males between social class and achievement of eleventh grade students in Pennsylvania. Contrary to these findings, however, Lueptow (1975) indicated that when associating father's income with achievement scores, the correlations of high school females ($r = .18$, $p<.05$) are found to be greater than those of males ($r = .15$, $p>.05$). These findings illustrate the somewhat unstable and conflicting results often seen in the literature when examining the relationship between SES and academic performance.

5.7 Summary

In summary, with reference to male-female comparisons for the Edmonton sample, the above findings reveal the relationships between non-inllective variables and academic achievement for females are generally greater than those reported for males, although not always significantly so.

The correlation analyses revealed that most of the hypotheses are confirmed as predicted, and are summarized as follows:

(1) With regards to personality, hypothesis 1 is not confirmed, as Extraversion is found to have an insignificant relationship with grade-point average, although the inverse direction of this relationship is as predicted.

(2) With reference to Neuroticism, hypothesis 2 is not confirmed as both the magnitude and the direction of this relationship with GPA are not as predicted.

(3) With regards to Psychoticism, hypothesis 3 is confirmed for both magnitude and direction, denoting an inverse relationship between Psychoticism and the GPA of students for this Edmonton sample.

(4) With regards to School Attitudes, hypothesis 4 is confirmed for School Motivation with regards to both magnitude and direction implying that positive school attitudes can be advantageous with reference to improved school achievement.

(5) With regards to Self-Concept-Performance Based and Self-Concept, Reference based, hypotheses 5 and 6 are respectively confirmed with respect to magnitude and direction. This finding suggests that self-confidence in academic matters and positive perceptions on how significant others evaluate one's academic potential are important for Edmonton adolescents.

(6) With regards to Control Over Performance, hypothesis 7 is confirmed for both magnitude and direction, although the magnitude of this relation is quite low. These results suggest that responsibility for one's actions is not a priority for Edmonton senior high school students.

(7) With regards to Instructional Mastery hypothesis 8 is confirmed for both direction and magnitude suggesting that grade 12 students see some relationship between the state of their actual instructional knowledge and scholastic success.

(8) With regards to Study Habits and Study Attitudes, hypothesis 9 is confirmed in both magnitude and direction, suggesting that for Edmonton high school seniors, efficient study procedures are moderately related to academic achievement.

(9) Finally, with regards to socioeconomic status, hypothesis 10 is not confirmed with reference to magnitude, but the direction is as predicted, denoting that for Edmonton adolescents, social class is not significantly related to high school marks.

5.8 Multiple Regression Analyses

The main focus of this Multiple Regression analysis is the prediction of academic achievement defined by GPA in this study. In order to examine whether the non-intellectual variables combined, or individually are effective predictors of academic achievement for the Edmonton high school sample, regression analysis will consist of three stages. The first stage seeks to determine the extent to which the combined package consisting of 12 non-intellective variables is an effective predictor of academic achievement. To accomplish this objective, the coefficient of multiple regression (R) is used as an index of the combined power of the 12 non-intellective measures used, that is, the total effect of the non-cognitive variables together. It should be noted that the larger the coefficient of multiple regression (R), the better the combined predictor variables account for the variation in the criterion measure, GPA. Finally, the multiple correlation coefficient (R) is then squared to produce another statistic which enhances the regression analysis. This squared multiple

correlation coefficient (R^2) represents the variance shared by the regression combination of all the non-intellective variables used, that is, the maximum amount of variance of academic achievement accounted for by the combination of the 12 non-intellective variables.

The second facet of this multiple regression analysis is again aimed at prediction, except in this instance, prediction is not focussed on the total or combined effect of all the non-intellective variables. Instead, the goal of the analysis is aimed at determining the predictive power of each test, singly, that is the independent contribution of each non-intellective variable in best predicting the criterion variable GPA. To accomplish this objective the statistic (R^2) is used again as an index of the actual proportion expressed as a percentage contributed to the prediction of academic achievement by each non-intellective variable. That is, the analysis seeks to discover the best individual predictors of GPA for the Edmonton high school sample.

A third stage of this Multiple Regression analysis is concerned with the prediction of academic achievement for each of the male and female sub-samples. The aim of the analysis is to investigate whether or not the general patterns of prediction observed in the two previous stages of analysis for the total sample applies as well for the male and female sub-samples differentially on the 12 variables of interest. Thus, as in the two previous stages, the analysis is concerned first with the extent to which the combined package of 12 non-intellective variables are useful in predicting academic achievement as defined by GPA for both males and females independently. As with the second goal

of the multiple regression analysis, the focus at this stage is to determine the predictive power of each individual non-cognitive variable in predicting the criterion variable GPA for both males and females, separately. Thus the same statistical approaches used previously are thus relevant for the separate multiple regression analysis for males and females.

Table 9 summarizes the stepwise multiple regression analysis for the 12 non-cognitive variables and the criterion measure, grade-point average. The multiple correlation coefficient statistic (R) is in column 3, while the squared multiple correlation statistic (R^2) is found in column 4. Column 6 gives the corresponding "beta weight" for each test expressed as a standardized score. The corresponding sequential F and probability statistics are provided in the last two columns respectively. The F values of the respective predictors show the final significance of each variable illustrating the fact that predictors may gain or lose significance when other predictors enter the equation. The rank order of the F values is not the same as the order of inclusion of the variables into the regression equation (Brown, 1976).

Inspection of Table 9 reveals the following findings of interest in this multiple regression analysis:

(a) The multiple correlation coefficient (R) derived from the combination of all non-intellective variables for the total sample is .54, indicating the importance of the combined predictive power of the 12 non-academic variables in predicting academic achievement for the

Table 9
Stepwise Multiple Regression of Personality Variables, Study Habits and Attitudes, School Attitudes and SES with GPA (N = 373)

STEP	Predictors	Multi-Correl. R	R^2	Variance Added %	Standardized B - Coeff.	Sequential F	Probability
1	S-C, R	.442	.195	19.5	.38	27.10	.000*
2	EXTR.	.466	.217	2.2	-0.17	13.74	.000*
3	S-C,P	.481	.231	1.4	.19	4.99	.000*
4	C.O.PERF.	.504	.254	2.3	-0.21	7.49	.000*
5	NEUR.	.514	.265	1.1	.11	4.61	.000*
6	SH	.523	.274	.9	.19	5.65	.000*
7	LIE	.531	.282	.8	-0.11	4.75	.000*
8	PSYCH.	.536	.287	.5	-0.08	2.38	.006*
9	SS	.536	.287	.00	.02	.26	.994
10	SA	.536	.288	.00	-0.03	.16	.999
11	INS.MAS.	.537	.288	.00	-0.01	.03	.998
12	SCH.MOT.	.537	.288	.00	-0.00	.003	1.000
*p<.05	Total Affective	R=.54	R^2=.29	28.7%			

high school sample in Edmonton. These results can be interpreted as indicating that the particular package of non-cognitive variables used in this study is a fairly good prediction of GPA for the Edmonton sample.

(b) With reference to the 29% total non-cognitive variance in academic achievement accounted for by the combination of the 12 non-intellective variables, Table 9, column 5 reveals the proportion of variance which each individual non-intellective variable contributes to GPA. Thus, Table 9 provides a useful picture of how the amount of criterion variance gradually augments, as one new factor after another is added. It should be noted, however, that only the increments in prediction that are statistically significant at the 5% level of significance are included in this analysis.

(c) With regards to the individual contributions of the 12 non-intellective variables to academic achievement, Table 9, column 5 reveals that there is considerable variability with regards to the predictability of each of the 12 non-intellective measures. Thus, the predictive power is not evenly spread among all the non-cognitive variables. It can be observed that variances range from 19.5% to 0%, with only 8 of the affective factors reaching the 5% level of significance or better. Of these non-intellective variables, Self-Concept- Reference Based (19.5%); Extraversion (2.2%); Self-Concept-Performance Based (1.4%) and Control over Performance (2.3%) are the only factors with psychological and practical significance with reference to prediction of academic achievement. The

remaining variables, of which Neuroticism, Study Habits, Lie Scale and Psychoticism reached statistical significance, add rather little to the prediction provided by the first four listed variables.

(d) Specifically, Table 9 reveals that Self-Concept-Reference Based plays the largest role in predicting academic achievement. It adds substantial predictive power (19.5%) and is thus the best individual predictor of high school GPA for the Edmonton sample. This finding is consistent with that found for the correlation analyses. There, Self-Concept, Reference based also had the strongest relationship with grade-point average ($r = .44$, $p<.05$) when compared to the other affective variables.

It is surprising that Self-Concept-Reference Based compared with the other non-intellective variables, plays such a significant role statistically and psychologically in predicting academic achievement. It was expected that variables such as study habits, study attitudes and school motivation would play a more substantial role in predicting grade-point average (Gillis & Lee, 1978). It seems that for this sample, the academic outcome of students appear not to be contingent on the lack of school resolve, or the types of study patterns considered necessary for good grades. This finding suggests that for Edmonton senior high school students, achievement outcomes are influenced predominantly by the perceived evaluations of how significant others view a student's academic potential and ability. Bailey (1971) suggests that students who discern that important others expect them to do poorly in school, will often perform in accord with these expectations. He

indicated that such presumptions are cogent in that their effects may enhance or restrict some students' ability to fulfill their native capacity and further achieve optimally. Conger (1977), however, proposes that the dependence of high school students on the evaluation by "others" is a common, but essential developmental struggle for adolescents. Central to his view is the notion that adolescence involves the emancipation from parents, usually resulting in greater reliance on teachers' expectations and peer alliances.

(e) According to the results of the stepwise multiple regression analysis presented in Table 9, the second most significant predictor of high school academic achievement is Extraversion. The multiple correlation coefficient found for this personality dimension is .466, with an R^2 of .217. Extraversion adds 2.2% to the variance already accounted for by Self-Concept-Reference Based, which contributed 19.5% of the variance being investigated. Although this finding is statistically significant, Extraversion accounts for a small percentage of the variance in GPA and so has minor psychological and practical importance. Other researchers have found inconsistent results. Goh and Moore (1978) investigated three educational levels: university, trade school and high school, and found significant contributions of extraversion to the prediction of GPA for both the university (R^2 = .06, $p<.05$) and trade school (R^2 = .17, $p<.01$) sample. However, consistent with this Edmonton study, a small contribution by extraversion to the prediction of school achievement was seen in the high school sample (R^2

= .02, p>.05), again alluding to the modest influence this factor has on grade-point average.

(f) Table 9 further indicates that Self-Concept-Performance Based exerts a small, but statistically significant influence to the variance of academic achievement (1.4%), with a R of .418 and an R^2 of .231. According to this finding, Self-Concept, Performance contributes 1.4% to the variance already accounted for by the two preceding predictor variables, Extraversion (2.2%) and Self-concept, Reference (19.5%).

This research finding is initially surprising as Self-Concept-Performance Based revealed a simple correlation of (r = .40, p<.05) with grade-point average, second only to the association between Self-Concept-Reference Based and GPA (R = .44, p<.05). It seems that when in combination with other affective variables, however, Self-Concept-Performance Based loses some of its importance and influence with reference to GPA. Specifically, this indicates, that self-confidence about one's ability to learn academic material is not a major predictor of academic success. It is possible, as Shrauger and Schoeneman (1979) advocate, that academic self-evaluations are basically the products of how we think the significant people in our lives perceive us, again underscoring the importance of Self-Concept-Reference Based as a salient predictor of GPA, as indicated in this study.

(g) Perusal of Table 9 also reveals that Control over Performance exerts a small but significant influence to the achievement variance of high school students in Edmonton (2.3%), with a multiple correlation of (R = .504) and an R^2 of .254. Control over Performance then adds only

2.3% to the variance already accounted for by the three preceding predictor variables. Other studies have reported locus of control to be a more important predictor of GPA, however, as Bar-Tal et al. (1980), found this factor to account for only 9.7% of the explained achievement variance in a grade nine sample.

Inspection of Table 9 shows Neuroticism (1.1%), Study Habits (.9%), Lie Scale (.8%) and Psychoticism (.5%) to have minimal predictive power. These statistics, although significant add little to the variance of GPA already accounted for by the previous predictor variables.

Finally, the remaining variables seen in Table 9: Socioeconomic Status, Study Attitudes, Instructional mastery and School Motivation together failed to add significantly (0%) to the variance of high school achievement already accounted for by the preceding non-intellective variables and so have negligible predictive power against the main criterion.

In summary:

1. The total predictive power of the 12 non-cognitive variables combined is R = .54, with an R^2 of .29, indicating that 29% of the achievement variance is accounted for.

2. Stepwise Multiple Regression analysis revealed, that of the individual non-intellective variables selected for analysis, Self-Concept Reference based is the best single prediction of grade-point average (19.5%). Three other non-cognitive variables, which add significant, but small increments of variance are: Extraversion

(2.2%), Control over Performance (2.3%), and Self-Concept, Performance based (1.4%).

3. The other variables which reached significance are: Neuroticism (1.1%), Study Habits (.9%), Lie Scale (.8%) and Psychoticism (.5%). These factors, however, are considered to be of little psychological or practical significance because of their low predictive power with respect to GPA.

4. All other variables did not reach significance and consequently do not play a role in predicting high school academic achievement. This is somewhat surprising, as the literature review in Chapter 2 of this study indicates that school motivation, SES, and study attitudes are relatively important influences on academic performance. However, they have seemingly little or no impact on the grade-point average of students in this study. It is conceivable that by the time students reach the senior year of high school, they may have already acquired the necessary study behaviours and positive attitudes towards school.

5.9 Multiple Regression Analyses, Females-Males Comparisons

In Tables 10 and 11 are shown the Multiple Regression Analysis of the Personality variables, Study Habits and Attitudes, School Attitudes and Socioeconomic Status with high school grade-point average, for the female and male subsamples respectively. The general pattern of prediction for the female and male samples will be analyzed and comparisons made. Comparisons will be made on the combined predictability of the affective variables as well as the individual contributions of each variable for females and males.

Inspection of Tables 10 and 11 reveals the following findings of interest for females and males respectively in this multiple regression analysis.

(a) A comparison of the data for the two sub-samples shows that the degree of prediction is higher for females compared with males. The multiple correlation coefficient (R) seen in Table 10 for females is .60, while that for males reported in Table 11 is .50, illustrating the greater combined predictive power of affective factors for females when compared to males. Specifically, Table 10, column 4 reveals that the combined package of non-academic predictors for females accounts for approximately 36% of their achievement variance, while Table 11, column 4 for males, shows only 25% of this achievement variance accounted for.

This finding may be interpreted to mean that the academic achievement of Edmonton high school females is more predictable than males with reference to non-intellective variables. It should be noted that other research findings concerning the explanation of achievement variance are consistent with the results found in this study. Prawat (1976) in a study with junior high school students reported that 58% of the achievement variance of females could be accounted for by selected affective instruments, whereas only 16% of the achievement variance of males could be predicted. These results also provide support for Lavin's (1965) and Khan's (1969) conclusion that adolescent females tend to be more predictable than males with regards to scholastic achievement. Thus the proportion of variance of academic achievement accounted for by the non-intellective variables is higher for females

Table 10
Stepwise Multiple Regression of Personality Variables, Study Habits and Attitudes, School Attitudes and SES with GPA for Females (N=174)

STEP	Predictors	Multi-Correl. R	R^2	Variance Added %	Standardized B - Coeff.	Sequential F	Probability
1	S-C, R	.521	.271	27.1	.41	13.50	.000*
2	EXTR.	.543	.295	2.4	-0.20	7.68	.000*
3	S-C, P	.562	.316	2.1	.24	3.30	.000*
4	LIE	.577	.333	1.7	-0.11	2.26	.011*
5	C.O.PERF.	.583	.340	.7	-0.11	.95	.496
6	SH	.590	.348	.8	.18	2.24	.012*
7	SA	.593	.352	.4	-0.12	1.05	.410
8	NEUR.	.595	.355	.3	.06	.66	.788
9	PSYCH.	.598	.357	.2	.08	.98	.472
10	SCH.MOT.	.600	.360	.3	.09	.85	.596
11	SS	.601	.361	.00	-0.02	.10	1.000
12	INS.MAS.	.601	.361	.00	.01	.01	1.000
*p<.05	Total Affective	R=.60	R^2=.36	36%			

Table 11
Stepwise Multiple Regression of Personality Variables, Study Habits and Attitudes, School Attitudes and SES with GPA for Males (N=199)

STEP	Predictors	Multi-Correl. R	R^2	Variance Added %	Standardized B - Coeff.	Sequential F	Probability
1	S-C, R	.358	.128	12.8	.37	13.95	.000*
2	C.O.PERF.	.395	.156	2.8	-0.29	7.87	.000*
3	EXTR.	.432	.187	3.1	-0.19	7.59	.000*
4	PSYCH.	.454	.206	1.9	-0.15	4.24	.000*
5	S-C,P	.467	.218	1.2	.16	1.75	.060
6	LIE	.483	.233	1.5	-0.14	4.03	.000*
7	SH	.488	.238	.5	.11	1.01	.446
8	NEUR.	.495	.245	.7	.10	1.74	.062
9	SCH.MOT.	.496	.246	.1	-0.08	.65	.795
10	SA	.497	.247	.1	.05	.19	.999
11	INS.MAS.	.497	.248	.00	.03	.08	1.000
12	SS	.498	.248	.1	.01	.03	1.000
*p<.05	Total Affective	R=.50	R^2=.25	24.8%			

(36%) than that found for males (25%), or for the total sample (29%), when non-academic variables are used in combination to predict such achievement.

(b) Considering the individual contributions of the 12 non-intellective variables to academic achievement, the pattern and order of predictability differed somewhat in the female and male sub-samples seen in Tables 10 and 11 respectively. It is observed that academic Self-Concept-Reference Based, as was the case for the total sample is the best single predictor of grade-point average for both the female and male sub-samples. It adds considerable predictive power and makes a significant independent contribution to the explained achievement variance for females (27%) and males (13%) as seen in Tables 10 and 11 respectively. This finding is particularly meaningful for females in this Edmonton setting as Self-Concept-Reference Based has a powerful impact on achievement, consuming a large proportion of the variance, eventually accounted for (36%) by a combination of the 12 affective predictors. It would seem reasonable to conclude, then, for both female and male grade 12 students, those who receive the highest grades, tend to be those who perceive themselves as successful achievers in relation to peer or student evaluations (Brookover & Thomas, 1964). This is not surprising, as Self-Concept-Reference Based is seen to have the most significant and consistent association with GPA throughout this study for the total sample ($r = .44$, $p<.05$) as well as for females ($r = .52$, $p<.05$) and males ($r = .36$, $p<.05$). This finding highlights the relative importance of this variable for an urban high school sample.

Concerning the other non-intellective variables, the regression analyses presented in Table 10 for females reveals the second most significant predictor of GPA, as obtained for the total sample is Extraversion, with a multiple correlation coefficient of .543, and an R^2 of .297, adding 2.4% to the variance already accounted for by Self-Concept-Reference Based (27.1%) with regards to achievement. For males, however, Table 11 shows the second most important variable in the prediction of academic achievement is Control over Performance, revealing a multiple R of .395 and an R^2 of .156, and adding 2.8% to the variance already accounted for by Self-Concept-Reference Based (12.8%). Although these findings for females and males are statistically significant ($p<.001$), they account for only small percentages of the variance in GPA and so have secondary psychological and practical consequences.

The third most important predictor of GPA for Females, like that found for the total sample is Self-Concept, Performance, as seen in Table 10. This variable exerts a small, but statistically significant influence on achievement variance (2.1%) with an R of .562 and an R^2 of .316. According to this finding, Self-Concept, Performance contributes 2.1% to the variance already accounted for by the two preceding predictor variables, Extraversion (2.4%) and Self-Concept, Reference (27.1%). For males, the third most significant influence on GPA, as seen in Table 11 is Extraversion, unlike that found for either the female, or total sample. This variable revealed a multiple R of .432 and an R^2 of .187, adding 3.1% to the variance already accounted for by

the preceding two variables, Control over Performance (2.8%) and Self-Concept, Reference (12.8%). As previously stated, although these factors make significant and unique contributions to the prediction of GPA, their percentages are small and so have little practical importance.

Examination of Table 10 for females, further shows Lie Scale (1.7%) and Study Habits (.8%) to have slight predictive impact on academic achievement. Perusal of Table 11 for males also reveals significant but small increments to the prediction of GPA by Psychoticism (1.9%) and Lie Scale (1.5%). Although these statistics are significant, they add little to the variance of academic achievement already accounted for by the previous non-intellective variables.

Finally, the remaining variables seen in Table 10 for females: Control over Performance (.7%), Study Attitudes (.4%), Neuroticism (.3%), psychoticism (.2%), School Motivation (.3%), SES (0%) and Instructional Mastery (0%) all failed to add significantly to the achievement variance already accounted for by the preceding non-intellective variables, thus resulting in the minimal predictive efficacy against GPA.

Similarly, Table 11 indicates that the remaining variables for males are: Self-Concept-Performance Based (1.2%), Study Habits (.5%), Neuroticism (.7%), School Motivation (.1%), Study Attitudes (.1%), Instructional Mastery (0%) and SES (.1%). These variables all failed to add significantly to the incremental predictive power of

non-intellective variables to grade 12 academic achievement variance already accounted for by preceding affective predictors for this sample.

In summary:

1. The total predictive power of the 12 non-cognitive variables combined for females is R = .60, with an R^2 of .36, indicating that 36% of achievement variance in Edmonton grade 12 girls is accounted for.

The total predictive power of the 12 non-cognitive variables in combination for males, however, is lower than that reported for females with an observed R of .50, and an R^2 of .25. This shows that 25% of the achievement variance in Edmonton high school boys is accounted for by non-cognitive variables.

2. Stepwise Multiple Regression analyses revealed, that of the individual non-cognitive variables selected for analysis for females, results indicate, as with the total sample, that Self-Concept-Reference Based is the best single predictor of GPA, contributing 27% to this variance. Four other variables which added significant, but small increments of achievement variance are: Extraversion (2.4%), Self-Concept-Performance Based (2.1%), Lie Scale (1.7%) and Study Habits (.8%).

Similarly, for males, Multiple Regression Analyses revealed that of the total non-cognitive variables selected for this study, results show, as with the total sample and that found for females, that Self-Concept-Reference Based is the best single predictor of the grade 12 GPA for males, contributing approximately 13% to this variance. This influence, however, is found to be lower than that reported for both females (27%)

and the total sample (19%), although it consumes a considerable portion of the achievement variance for males, finally accounted for by all affective predictors (25%) at the last step.

3. Finally, all other non-cognitive variables did not reach statistical significance and so play a negligible role in the prediction of academic performance. It should be noted that the general pattern of prediction is very similar between the total sample and that for females and males. All significant non-cognitive predictors for both males and females are consistent with the significant variables found for the total sample, showing the relative consistency of these results.

6. CONCLUSION AND IMPLICATIONS

The major concern of this study was to explore the relationships of selected non-cognitive variables and high-school achievement. A secondary concern of the study related to identifying which of these non-intellective variables best predicted the aforementioned achievement. Results of the correlation analyses confirmed the central hypotheses of the study that non-cognitive factors significantly influence grade-point average. However, broad generalizations based on these results have been inferred with caution as correlations tended to be rather small, although statistically significant, due to the large sample size. In a descending order of magnitude, Self-Concept-Reference Based and Self-Concept-Performance Based revealed the highest correlations with academic achievement for the female, male and total sample. These factors are therefore deemed to be of the most psychological and practical importance.

A secondary purpose of the study was to determine the independent contribution of the selected non-intellective variables to the prediction of high school achievement. Results of the regression analyses revealed systematic patterns of predictions for the female, male and total sample. Self-Concept-Reference Based was found to be the overwhelming best predictor of high school achievement for each of the three groups.

Another finding of interest was that the non-intellective variables of this study accounted for a greater percentage of the achievement variance in GPA for females as compared with males. This result

suggests that when exploring possible reasons for the poor achievement of females, it is even more crucial to be aware of non-intellectual factors than when considering similar underachievement for males.

In summary, this study indicated that the particular package of non-cognitive variables investigated had significant effects on high school achievement and that these different non-intellective measures should not be ignored in the prediction of GPA. The author feels that a better understanding of the non-intellective characteristics of adolescents may also provide a useful framework for school officials concerned with effective academic achievement.

6.1 Practical Implications

Some benefits of including non-cognitive variables as influencing factors in the academic efficiency of high school education are relevant as they influence student attitudes and interests. As such, they cannot be ignored when considering the academic effectiveness of a student. In fact, students can be directly involved as agents of change and such change can be brought about by the accepting and personal approaches of teachers. Groffman (1971) and Brophy (1975) also emphasized the importance of mutual cooperation and respect between teacher and student in the education process, in order to facilitate significant academic gains.

A recognition of affective influences by school personnel may also cause student interests to coincide with the goals of the school administration. This in turn may lead to overt support for school programs and changes in personnel as well as more effective

communication among students, parents and teachers. This point of view has been stressed by Messick (1978) and Mahoney (1974).

Schools should take a direct interest in ensuring that the social and emotional development of a student is given appropriate attention in any program of academic concentration. As such, values, attitudes and self-esteem are frequently suggested in the research literature as the most crucial affective factors (Hesburgh, 1979; Epstein, 1973). These affective characteristics are important in determining how individuals react to social situations and this knowledge may help them to formulate personal goals. Especially important is the role of the school in developing and reinforcing values that are meaningful and significant to the student. Tjosvold (1977) reported that students tend to be happier and accomplish greater academic success when able to make significant choices in their daily schedule of activities.

It may be important that in any initial assessment of a student entering high school, attention should be divided between assessment of affective variables and academic variables. Such data will tend to give a more complete picture of the status of the student and can thus provide the basis for any counseling which may be necessary in the future. The late adolescent years are ideally a period of struggling over identities and acceptance of oneself by others (Bernard, 1981). Those who work in education should attempt to create a milieu which encourages and facilitates self-exploration and provides for a stable environment in which to risk a re-examination of self in relation to

others. Such a focus emphasizes the importance of providing support and stimulation for social as well as academic areas of development.

Specifically, since Self-Concept-Reference Based is such an important factor in academic achievement, teachers as significant people in the lives of high school students should be aware of their responsibility in recognizing and reinforcing effort and achievement of students. This point of view is advocated by Thompson (1985) who suggests that next to the home, schools probably exert the single greatest influence on how students perceive themselves and their abilities. Positive attitudes on the part of teachers may counteract any negative peer influence. Also, such positive teacher attitudes should be communicated to parents, who in turn may further reinforce such positive attitudes in their children. Parents are probably the most powerful source determining the self-esteem of youth (Battle, 1982), and should thus provide unconditional, positive regard for their child. This process involves the parents communicating to the child that he/she is loved and prized and that this evaluation is not contingent on any predetermined condition. Thus, both the home and the school can exert a great influence on how students see themselves and how they assess their abilities. Such positive self-concept development may result in improved academic performance. Students are also likely to respond in positive ways when they are aware that significant others hold positive views of their ability and performance.

For students who believe that significant others do not hold positive views of their ability and achievement, there may be need for

counseling, especially when such a negative self-concept is related to academic achievement. Combs et al., (1978) suggest that the enhancement of the perceived self is the basic motive behind all behaviour and so pivotal in determining academic functioning. Counsellors can then utilize a number of strategies such as peer tutoring (Damico, 1976), assertiveness training (Alberti & Emmon, 1974) or supportive group counselling (Purkey & Novak, 1984) techniques to develop a positive self-concept in the student. This approach is enhanced when undertaken in conjunction with parents of the students.

6.2 Research Implications

Since this study involved a sample of high school students, it would be interesting to replicate it with a sample of junior-high school students to determine whether the same non-intellective factors affect junior-high school achievement. Such studies may be undertaken in rural areas and compared with similar findings from urban areas to determine whether the same factors are situationally operative.

There is need for further validation of the School Attitude Measure (SAM), the instrument used for measuring several dimensions of school attitudes in this study. The lack of sufficient studies in the research literature using this instrument is a drawback. Thus, the validation studies suggested here will provide useful information about the validity and reliability of the SAM.

Self-Concept-Reference Based should be investigated as a single factor affecting academic performance, given the appropriate valid and reliable instruments to make the measurements. Not only should

Self-Concept-Reference Based be investigated for its direct influence on achievement, but the variables which influence Self-Concept-Reference Based, such as parents, teachers and peers should similarly be investigated. Information from such studies should be useful to counsellors, parents and teachers concerned with the influence of Self-Concept, Reference based on academic achievement.

In all these suggestions for further research into the affective influences on high school academic performance, differential studies may be undertaken with samples of males for comparison with those of females. Samples of students who along the way found it necessary to repeat grades may also be investigated to determine the impact of affective variables in their struggle to achieve academically.

Because the sample chosen for this study generally involved students from middle class backgrounds, it would be interesting to replicate this study with students from high and low SES backgrounds. Such findings can facilitate comparisons and extend the generalizability of these results.

Finally, it would be interesting to replicate this study, further examining the effects of non-intellectual variables on academic achievement for other groups such as the learning disabled, gifted, or delinquent adolescents. Such findings may have merit for both theoretical and classroom application.

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APPENDICES

APPENDIX 1

GRADE 12 STUDENT PARTICIPATION FORM

I am a graduate student at the University of Alberta, and I am requesting your cooperation in participating in a research project being conducted at your school.

The aim of this project is to sample your views on various aspects of academic attitudes and feelings. You will be asked to complete written questionnaires in a group setting, during school hours.

I would appreciate your assistance. Please sign below if you wish to participate. You will be informed of dates and times at a later date. Thank you for your cooperation.

Signature _____

Date _____

** This form to be completed only by those students who have completed English 20, and Math 20.

APPENDIX 2

STUDENT QUESTIONNAIRE

1. Name: _____ School _____
   Last First

2. Grade: ____, Male Female (circle) Age: _____

   Birthdate: _____
   month date year

3. Father's Occupation: _____
   State the specific work he does

4. Mother's Occupation: _____
   State the specific work she does

5. Guardian's Occupation (if applicable) _____
   State the specific work he/she does